Financial
Ratio
Study

Management Guide To
The PIA Ratio Study

Volume I

Annual ratio study compiled from the operating statements and balance sheets submitted by representative members of the printing industry and computed by RGS Enterprises, Inc., 1 Carlisle Drive, Arnold, Maryland 21012.

MANAGEMENT GUIDE TO THE PIA RATIO STUDIES

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PRINTING INDUSTRIES OF AMERICA, INC.

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New York and Philadelphia (Bala Cynwyd)

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Dear Member of the Graphic Arts Community:

The annual PIA Financial Ratio Study is the most comprehensive survey available on the financial health of the graphic arts industry. To help you use the study effectively, it is our pleasure to present to you this management guide.

The guide is divided into three sections. General information about the ratios is included in the first section. The second section includes step-by-step procedures to analyze the financial statements and important relationships inherent to the study and to prepare an analysis of your own financial statements. Meaningful financial topics relative to the graphic arts field supplement the guide and comprise the third section.

We believe strongly in the importance of sharing this type of information among members of the graphic arts commmunity and are proud to have played a role in compiling the PIA Financial Ratio Study.

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Each year Printing Industries of America, Inc. collects and publishes detailed financial ratio information for members of the graphic arts community. The data presented provides a detailed and comprehensive picture of the financial status of the major segments of the graphic arts industries in the U.S. and Canada. It allows individual firms to compare their annual performance with that of many other similar firms, including those which earn well above-average profits. Ratio results are published as follows:

- Management Guide to the PIA Ratios
- All Printers by Sales Volume
- All Printers by Product Specialty
- All Printers by Geographic Area
- Sheetfed Printers by Size and Geographic Area
- Web Offset Printers—Heatset
- Web Offset Printers—Non-Heatset
- Combination Offset—Sheetfed/Web
- Book Manufacturers' Ratios
- Large Printers' Ratios
- Typographers' Ratios
- Preparatory Specialists' Ratios
- Binders' Ratios
- Quick Printers

For a more complete composite picture of your company's performance relative to the industry as a whole, several books could be used in your analysis, such as one of the overview volumes, e.g., *All Printers by Sales Volume*, and one that addresses your particular business segment or production process, e.g., *Book Manufacturers or Web Offset—Heatset*, respectively. Alternatively, such analysis is facilitated by participating in the Ratio Study each year and ordering an individual company computer printout which compares a participant's ratios to those of companies which are similar in size and sales volume, produce the same products, and use the same manufacturing process.

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SECTION 1 - BACKGROUND ON THE RATIO STUDIES

THE PIA RATIO STUDIES - STANDARDS OF COMPARATIVE ANALYSIS FOR THE PRINTING INDUSTRY

The PIA Ratio Studies enable printing managers, using these standards of comparative financial analysis, to determine their company's position in the printing industry. Using the information from the ratios, printing managers can decide which of their company's policies to maintain, which to eliminate and which to improve in order to increase profits.

The Ratio Studies are organized into 13 individual studies, each in its own booklet. The 13 booklets are:

- All Printers by Sales Volume
- All Printers by Product Specialty
- All Printers by Geographic Area
- Sheetfed Printers by Size and Geographic Area
- Web Offset Printers - Heatset
- Web Offset Printers - Non-Heatset
- Combination Offset - Sheetfed/Web
- Book Manufacturers' Ratios
- Large Printers' Ratios
- Typographers' Ratios
- Preparatory Specialists' Ratios
- Binders' Ratios
- Quick Printers

Each booklet allows printing managers to compare their company's financial operations with the financial operations of other companies, including the industry's Profit Leaders, with similar manufacturing specialties, sales volume and geographical area. A company's strengths and weaknesses can be identified by the information contained in the Ratio Studies. They also help answer questions such as:

Are my expenses too high in relation to sales?
Is there too little or too much inventory in stock?
Am I producing enough value added sales?
Can we meet our debts as they mature?
Are our customers' receivables being collected promptly?
Should we increase our selling prices?
How can we increase our profits?

The value of the Ratio Studies to printing companies depends largely on how effectively they are used. The purpose of this management guide is to help printing managers make the fullest use of the Ratio Studies in analyzing and interpreting relevant financial information.

This guide is made up of three sections.

Section 1 introduces the ratios and discusses the three basic steps in using them — set-up, comparison, and analysis.

Section 2 expands upon the analysis and explains the relationship of the ratios to critical concepts in the financial management of printing companies.

Section 3 addresses several topics of current, more general, concern to the printing industry.

I. STATISTICAL INFORMATION -- HOW THE NUMBERS ARE FIGURED

The PIA Ratio Studies are computed using a method that avoids a distortion of the data by companies with very large or very small dollar amounts in any particular category. This distortion is known as "self-weighting" and unless precautions are taken, is rather common when dealing with statistics with extreme highs and lows.

Our method is a valid statistical approach that establishes a ratio or percentage between the sales of a company and each of its cost categories. The percentages are added and an average is computed. This average gives us an excellent basis for comparison.

The following example shows how this method eliminates the problem of possible distortion by very large firms.

			% of Sales	
Firm	Sales	Factory Payroll	Firm's Ratio Factory Payroll	PIA Ratio Factory Payroll
A	$ 200,000	$ 60,000	30.0%	
B	500,000	100,000	20.0	
C	8,000,000	975,000	12.2	
			62.2% divided by 3 = 20.7%	

II. WHO ARE "ALL FIRMS?"

In the PIA Ratio Studies the term "All Firms" has two distinct meanings. It is used to designate all the printing firms participating in the Ratio Studies, and at other times it refers to all participating firms in a particular sales category. When the term "All Firms" is used, the context in which it is used will make the meaning clear.

III. PROFIT LEADERS -- AND 8%

The term "Profit Leaders" describes those firms whose before-tax profit on sales is 8% or higher. The 8% profit standard is traditional in the printing industry. Just why 8% marks the dividing point between high profit and low profit is unclear, except that it has proven satisfactory. Each year about 20% of participating firms reach the "Profit Leader" status. Historically, the average pre-tax profits of all Profit Leaders has been 12%, with the range of profits extending from 8% to 16%.

	1982	1983	1984	1985	1986
Percentage of All Firms that are Profit Leaders	25.20%	18.20%	20.40%	20.10%	16.49%
Profit Leaders' Income before Taxes	12.15%	12.08%	11.90%	11.79%	11.94%

IV. WHY NOT USE "RETURN ON INVESTMENT" AS A PROFIT MEASURE?

Return on Investment (ROI) is one of the most comprehensive measures of profitability. Many printers have urged that it be used as the criterion for Profit Leaders. The PIA Ratio Studies confirm that those printing firms earning more than 8% or greater pre-tax profits also show a healthy ROI, averaging 16% in recent years. (For a more detailed study of ROI, see Section 2, pages 58-64.)

However, most of the printing industry relates profit to sales instead of to investment, and our data show that Profit Leaders also have good ROIs. There doesn't seem to be any overwhelming reason to change our measure of profitability at this time, but printing managers should pay close attention to ROI. It is an important measurement standard for management.

PIA MANAGEMENT GUIDE: EFFECTIVE USE OF RATIO STUDIES

The objective of the printing manager in using financial comparative analysis, such as is presented in the PIA Ratio Studies, is to obtain accurate, relevant information about the printing industry. He then can make good, reasoned economic decisions for his business, and increase his printing company's profits. Generally, a printing manager wants to know.....

Are my expenses too high in relation to my sales?
Do I have too little or too much inventory in stock?
Am I producing enough Value-Added sales?
Can we meet our debts as they mature?
Should we increase our selling prices?

And most important.....

How Can We Increase Our Profits?

The PIA Ratio Studies have helped answer these and other questions, but only when used effectively. How to use the Ratio Studies effectively is the subject of this management guide.

PURPOSE

Since their inception, the PIA Ratio Studies have proven that graphic arts industry firms can attain profits. Despite wide ranges of sales and many different areas of service or specialty, many firms have earned a handsome profit. While on the other hand, firms with the same level of sales and the same specialties, have not been profitable. The purpose of the Ratio Studies is to guide you and your company to higher profits, regardless of your size or specialty. The key is knowing how to use these studies effectively.

There are three basic steps in using the Ratios:

1. Set-up
2. Comparison
3. Analysis

Each of these steps is discussed below.

I. SETTING UP A CHART OF ACCOUNTS

A chart of accounts is your framework for collecting and recording financial data. If your chart of accounts is well designed, you can easily extract all the information necessary to compare your firm's performance with that of the industry's Profit Leaders.

There are other purposes, as well, for your chart of accounts. For example, a well designed, detailed chart of accounts can help you compute more accurate hourly cost rates. Valuable information for managing your budgeting and forecasting will be at your fingertips.

But charts of accounts are not like shirts or suits that can be purchased off the racks and fit with only a little adjusting. If your chart of accounts is not designed for a printing firm, and specifically your printing firm, it won't be particularly useful. The more "tailor-made" your chart of accounts is -- designed for your firm and your needs -- the more value it will provide.

A chart of accounts should segregate factory, selling and administrative expenses. It also should break down each major classification into more detailed parts. For example, Materials Costs would be divided into paper, ink, film, plates, other chargeable materials, and outside services. Outside services would be broken down further into art, composition, offset preparation, printing, bindery and other.

These are not the only classifications, nor are all the classifications appropriate to your printing firm. For example, if your plant has an in-house bindery and another firm sends out its bindery work, the respective charts of account would reflect this operating difference. However, the general format presented here for organizing a chart of accounts should be followed as closely as possible.

EXAMPLE 1 - HOW TO CHART ACCOUNTS

MATERIAL COSTS		
Paper		$ XXX
Ink		XXX
Film		XXX
Plates		XXX
Other Chargeable Materials		XXX
Outside Services		
Art	$ XXX	
Composition	XXX	
Offset Preparation	XXX	
Printing Services	XXX	
Bindery	XXX	
Other	XXX	XXX
TOTAL MATERIAL COSTS		$ XXX

IDENTIFY FUNCTIONS, DEPARTMENTS AND COST CENTERS

A useful chart of accounts is patterned after your company's organizational structure. Start by identifying your company's major operations, departments and cost centers. It also might be helpful to make a flow chart of how jobs are processed through your present system. This preliminary planning avoids the problems found in Example 2 where the company's accounts are not based on its organizational structure. In this example of how not to chart accounts, the only relevant information is the profit figure. This firm's management has no other data to identify problem areas or to evaluate the company's operations.

EXAMPLE 2 - HOW NOT TO CHART ACCOUNTS

SALES		$5,420,000
EXPENSES		
Wages	$1,788,600	
Materials	1,242,800	
Other materials	732,200	
Factory Expense and Maintenance	277,900	
Utilities, Electric	21,300	
Delivery	59,000	
Travel	48,200	
Advertising	26,100	
Telephone	26,600	
Insurance	30,900	
Office Expense	139,800	
Bad Debts	21,700	
Heat	38,300	
Employee Benefits	142,500	
Miscellaneous Expense	72,600	
Commissions	149,000	
Sales Discounts	39,400	
Depreciation	166,400	
Rent	124,200	
Taxes	153,900	5,301,400
		118,600
OTHER INCOME		
Discounts Taken	92,300	
Other Income	45,500	137,800
INCOME BEFORE INCOME TAXES		$ 256,400

Every company's financial system should be controlled through a chart of accounts. Each account should be broken down into detailed headings so that as much information as is necessary or relevant can be recorded. In broad terms, charts of accounts have similar formats, listing assets owned (cash, etc.), debts owed, income received (sales), and expenses. Specific accounts, however, are determined by the specific business or industry that the company is in.

For the printing industry, the PIA Standard Classification of Accounts is an excellent guide for shaping a chart of accounts to your particular firm. A well-designed chart of accounts for the printing industry will separate material costs into those accounts that apply to the industry and your firm. (See Example 1 - How to Chart Accounts). Note that in this example, "Outside Services" is divided into even greater detail. Using this detailed system, you will be able to identify (and correct) problem areas quickly. Without it, problem areas will remain hidden like a crack in an underground water pipe.

SUMMARY

1. Your chart of accounts should be based on your organizational structure.
2. Identify major functions, departments and cost centers.
3. How complex your chart of accounts is depends on the size of your company, the products and processes involved.
4. Try to make a flow chart of how jobs are processed through your system.
5. Diagram your functions and/or departments. (See Example 3)

IDENTIFY INCOME AND EXPENSES

Next, list in detail each type of income and each type of expense incurred. Using medium-sized printing firms as an example, the organizational structure in Example 3 shows it has administrative, selling, and factory departments. The factory department is further divided into cost centers for pre-press, press, bindery, and shipping. The pre-press cost center is broken down further into art, composition, and camera cost centers.

LIST ACCOUNT CLASSIFICATIONS

Listing your account classifications is the next step in developing your chart of accounts. These classifications should conform to those in the PIA Ratio Studies (PIA Standard Classification of Accounts) and should be arranged in a similar format. Keep in mind that detail is essential.

SAMPLE CLASSIFICATIONS IN A PRINTING COMPANY'S CHART OF ACCOUNTS

Current Assets

Cash in bank
Cash on hand
Accounts receivable
Allowance for doubtful accounts
Other receivables
Inventory
- Work in progress
- Paper
- Other chargeable materials and departmental supplies

Prepaid expenses
- Insurance
- Interest
- Officers' life insurance
- Taxes and other

Loans and exchanges

Current Liabilities

Notes payable
Accounts payable
Employees' federal withholding tax
Employees' and accrued FICA
Employees' local tax withheld
Employees' state tax withheld
Accrued state unemployment tax
Accrued federal unemployment tax
Sales tax collected
Estimated state and federal income taxes payable
Accrued
- Business taxes
- Interest
- Payroll
- Vacation payroll
- Other

Shareholders' Equity

Common Stock
Preferred Stock
Paid-in surplus
Retained earnings
Dividends paid
Treasury stock

Income

Sales
Sales returns and allowances
Sales discounts

Cost of Printing Produced

Materials
- Purchases
  - Paper
  - Ink
  - Film
  - Plates
  - Other materials
- Outside services
  - Art
  - Composition
  - Offset preparation
  - Printing services
  - Bindery
  - Other
- Purchase Discounts

SAMPLE CLASSIFICATIONS IN A PRINTING COMPANY'S CHART OF ACCOUNTS
(Continued)

Factory labor
- Direct labor
- Indirect labor
- Supervision
- Employees' benefits - factory
- Payroll taxes - factory

Factory expenses
- Factory depreciation
- Factory supplies and expenses
- Heat, light and power
- Postage and freight
- Real estate taxes
- Rent
- Repairs and Maintenance
  - Buildings
  - Equipment
- Vehicle expense

Administrative Expense

Accounting and legal
Bad debts
Collection expenses
Computer services
Contributions
Depreciation - administrative
Dues and subscriptions
Employees' benefits - administrative
Office salaries
Office supplies and expenses
Officers' life insurance
Officers' salaries
Payroll taxes - administrative
Postage
Taxes - business
Telephone

Selling Expenses

Advertising
Auto expenses - selling
Depreciation - selling
Employees' benefits - selling
Gifts and flowers
Payroll taxes - selling
Sales office expenses
Sales salaries and commissions
Sales and travel expenses

Interest Expense

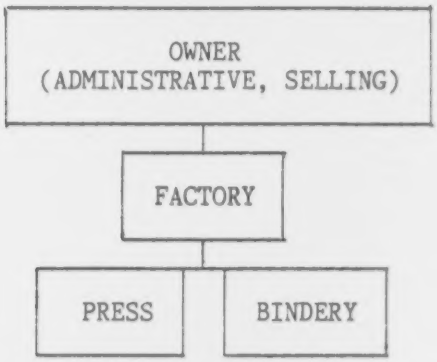
(Interest expense is the only account in this category, but it is, nevertheless, an essential account.)

Other Income - Expense

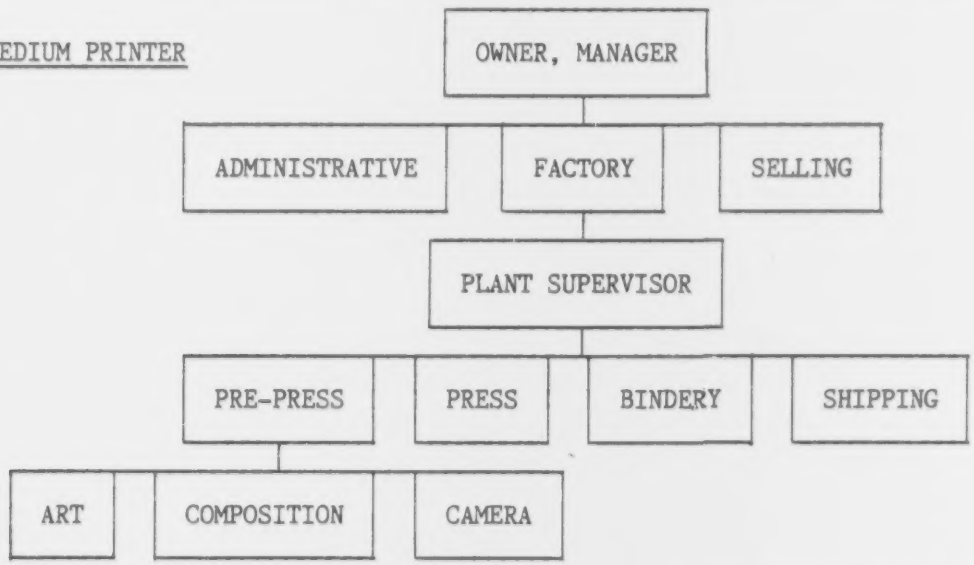
Interest Income
Gain or loss on sale of fixed assets
Other income
Other expense
Provision for state and federal income taxes

EXAMPLE 3 - ORGANIZATIONAL CHARTS

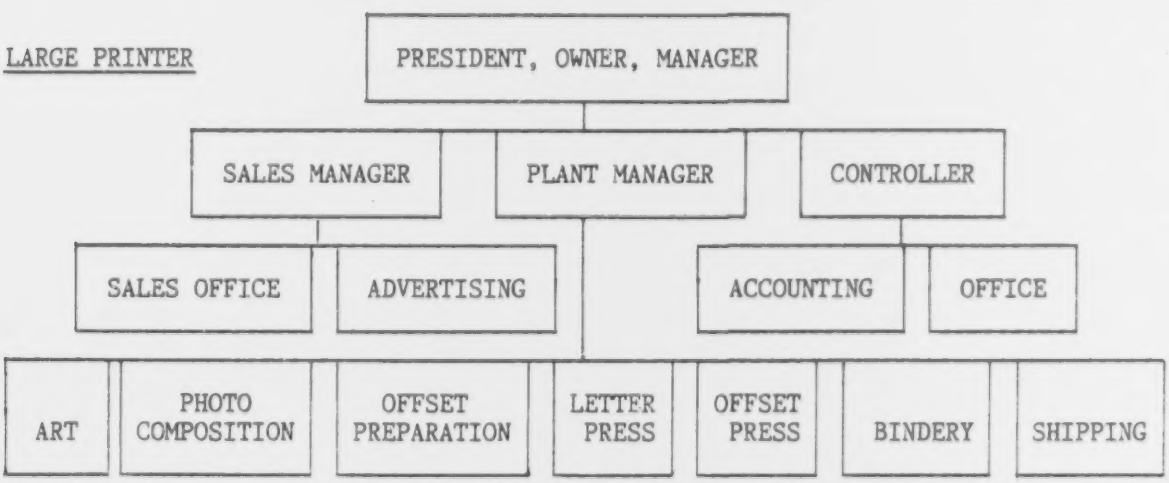
SMALL PRINTER



MEDIUM PRINTER



LARGE PRINTER



SEGREGATE DUTIES

We will use one expense -- Payroll -- to illustrate the process. Start by identifying each employee's job function. Then organize the job functions, based on your organizational chart, into factory employees, administrative employees and selling employees. Organize payroll related expenses, such as payroll taxes and employee benefits, in the same way.

Identifying the job functions of factory employees is not difficult, but it does take some planning. The factory is where most of your employees work and where your company's product is made. Let's assume that your payroll records have identified 15 factory employees.

The positions used here are for illustration purposes only and do not necessarily reflect the proportions of indirect to direct wages as would be found in a standard operation. These job functions are:

JOB POSITION OF FACTORY EMPLOYEES

1. Plant Supervisor
2. Shipping Clerk/Truck Driver
3. Platemaker
4. Artist
5. General Help
6. Pressman
7. Pressman's Apprentice
8. Proofreader
9. Compugraphic Operator
10. Stripper
11. Maintenance
12. Cutter
13. Folder
14. Hand Binder
15. Cameraman

Now, match each job with the corresponding cost center in the organizational chart. Note that there is a separate job function for general helpers, shipping clerks/truck drivers. Cost-benefit analysis comes into play here. General helpers are used in almost every part of the plant. Their work cannot be directly charged to a particular job, therefore their payroll expenses should not be classified as direct labor. The same applies to shipping clerks/truck drivers. These employees should be classified as indirect labor, responsible for general factory duties. The PIA Standard Classification of Accounts itemizes these wages as:

a. General Factory Salaries and Wages
b. Packing, Shipping and Delivery Wages

HOW TO CHART THE ACCOUNTS

Based on the PIA Standard Classification of Accounts, we will chart the Factory Payroll accounts using the information obtained by identifying functions and segregating duties. This is the result:

EXECUTIVE SALARIES.....	Plant Supervisor
INDIRECT WAGES	
PACKING, SHIPPING AND DELIVERY WAGES.....	Shipping Clerk/Truck Driver
GENERAL FACTORY WAGES.....	General Helper
	Maintenance
DIRECT WAGES	
PRE-PRESS	
ART.....	Artist
COMPOSITION.....	Compugraphic Operator
	Proofreader
CAMERA.....	Cameraman
	Stripper
PLATE.....	Platemaker
PRESS.....	Pressman
	Pressman's Apprentice
BINDERY.....	Cutter
	Folder
	Hand Binder

Combining individual's wages, by department, for your Factory Payroll section of the Statement of Income would result in:

FACTORY PAYROLL	
Executive salaries	$ XXX
Direct wages	XXX
General factory wages	XXX
Packing, shipping and delivery wages	XXX
Payroll taxes	XXX
Employee benefits	XXX
TOTAL FACTORY PAYROLL	$ XXX

In this example we dealt only with Factory Payroll. Other expenses and revenues should be identified, separated and charted according to the proper cost centers in your organizational chart. The result will be an organized chart of accounts from which you can draw information for meaningful financial statements.

II. COMPARE

There must be some common denominator that will enable us to compare the financial information in your chart of accounts with the PIA Ratio Studies. When dollars are converted into percentages, you then have a common denominator called "common size" statements. Dollar amounts will be different for each firm; "common size" statements or percentages are comparable because each company's percentage base for comparison is identical — 100% of Sales, 100% of Value Added, or 100% of Total Assets.

With your chart of accounts set up to conform to the PIA Standard Classification of Accounts, and the dollar amounts converted to "common size" or percentages of sales, you are ready to compare your costs and profits with PIA Profit Leaders. Using Example 4 (below), Your Company's costs of $426,800 for Outside Services may be good or poor -- we can't tell. But, when we see it represents 10.67% of sales, it becomes very meaningful when compared to the target range set by PIA Profit Leaders -- 9.08% of sales, a difference of 1.59%.

EXAMPLE 4 - REPORT ON OPERATIONS

	YOUR COMPANY		PIA PROFIT LEADERS	DIFFERENCE
	DOLLARS	"COMMON SIZE" OR % OF SALES	"COMMON SIZE" OR % OF SALES	MORE (LESS)
SALES OR VALUE OF PRODUCT PRODUCED	$4,000,000	100.00%	100.00%	-
FACTORY COST OF PRODUCT				
MATERIAL				
Paper	835,500	20.89	21.09	(0.20)%
Other Chargeable Materials	214,500	5.36	4.48	0.88
Outside Services	426,800	10.67	9.08	1.59
TOTAL MATERIAL	1,476,800	36.92	34.65	2.27
FACTORY PAYROLL	1,075,200	26.88	24.05	2.83
FACTORY EXPENSE	511,200	12.78	12.08	0.70
TOTAL FACTORY COST OF PRODUCT	3,063,200	76.58	70.78	5.80
GROSS PROFIT	936,800	23.42	29.22	(5.80)
ADMINISTRATIVE AND SELLING EXPENSES				
Administrative expenses	515,200	12.88	9.54	3.34
Selling expenses	217,200	5.43	8.16	(2.73)
TOTAL ADMINISTRATIVE AND SELLING EXPENSES	732,400	18.31	17.70	0.61
INCOME BEFORE INTEREST EXPENSE	204,400	5.11	11.52	(6.41)
Interest expense	79,600	1.99	1.54	0.45
OPERATING INCOME	124,800	3.12	9.98	(6.86)
Other Income	28,000	0.70	1.03	(0.33)
INCOME BEFORE INCOME TAXES	$ 152,800	3.82%	11.01%	(7.19)%

PICK YOUR CATEGORIES FOR COMPARISON

Your "common size" statements or percentages can be compared with other firms in several different ways. You may compare your percentages with those of All Firms in a particular category such as sales volume or product specialty, or only with Profit Leaders in those categories. The illustration below, Categories For Comparison, lists the possible categories of comparison. Keep in mind that there may be other outside factors influencing your firm's position in the industry. The PIA Ratio Books suggest what these other relevant factors may be, to help you refine your analysis.

CATEGORIES FOR COMPARISON

SALES VOLUME - Ratios and statistics are presented in six categories:

Sales to $250,000	$1,500,000 - $5,000,000
$250,000 - $500,000	$5,000,000 - $10,000,000
$500,000 - $1,500,000	Sales over $10,000,000*

* A separate PIA Ratio Book LARGE PRINTING FIRMS' RATIOS breaks down this sales category as follows:

$10,000,000 - $20,000,000	$40,000,000 - $80,000,000
$20,000,000 - $40,000,000	$80,000,000 - $160,000,000

PRODUCT SPECIALTY - The PIA Ratio Studies carry "common size" or percentages for firms with more than 50% of their sales in these key market areas:

Commercial and Advertising	Label
Magazine and Periodical	Book
Newspaper	Typographers
Packaging	Binders
Financial	Preparatory Specialists
Direct Mail - Catalog	Quick Printers
Directory	

PROCESS - The PIA Ratio Studies provide comparisons of firms mainly using these processes:

Sheetfed Offset
Web Offset - Heatset
Web Offset - Non-Heatset
Combination Offset - Sheetfed/Web

GEOGRAPHIC AREA - Significant financial information for comparison can be drawn from companies working in the same economic environment. The Ratio Studies break down geographic regions as follow:

New England and Upstate New York	Chicago Area
Metropolitan New York and New Jersey	West North Central
Eastern Pennsylvania, Maryland and D.C.	Plains and Mountain States
Southeast Atlantic	Pacific Southwest
East North Central	Pacific Northwest
South Central	Canada

Identify which of the categories listed above reflect your company's operations and compare your results with theirs. You will then be ready for the next, and most important, step in the meaningful use of the ratios: ANALYSIS. Analysis will help you identify the problem areas and the profitable areas in your company's operations.

III. ANALYSIS

One reason, but by no means the only reason, for analyzing the financial status of your printing business is to determine its overall position in the printing industry. Comparing your company with other, similar companies, enables you to determine which financial operations should be maintained at their current level and which should be improved to achieve your profit objectives.

Comparative financial analysis should be broad. It is important to evaluate all of the ratios together, not just individually. Moreover, your financial analysis should include an examination of ratios over a period of time, and a comparison of results with trends in the printing industry.

Evaluate Ratios Collectively, Not Individually

Individual ratio results may pinpoint a problem area in your printing operation or they may highlight a very profitable cost center, but individual ratio results do not provide in-depth financial information. Each ratio should be analyzed together with other ratios and facts concerning your company.

For example, in examining your firm's income statement, you may find increases in your percentages of depreciation expense and interest expense, increases that may seem alarming at first glance. An analysis of the balance sheet, however, may show that such alarm is unwarranted.

Top management may have long-range profit planning goals that should be factored into the analysis. There may have been a plant expansion (increase in assets) funded through attractive debt financing (increase in liabilities). A slow, outdated press may have been replaced by a new, more efficient one. Deeper analysis into the income statement may show that the company's income tax rate was lowered by investment tax credits and accelerated depreciation on the new press. Don't take one ratio out of context. Make your analysis broad enough to take all your financial results into consideration.

Observe, Assess, Monitor

Your firm and its operations are not static. Observing your ratios over a period of time will show a number of trends and movements in your expense and profit picture on which a printing manager may wish to act. If some action is taken, monitoring ratios on a regular basis will help show if the action was effective or appropriate.

Trend Analysis

If one of your company's ratios is way "out of line," it is possible that there is nothing you can to to improve it. This is especially true if the entire printing industry is suffering a slump in a particular area. Furthermore, if industry trends should be showing improvement, any action on your part may be counter-effective.

For example, when paper costs soared nationwide, some printing managers might have panicked and made hasty decisions to avoid tying up substantial amounts of cash by reducing their paper inventories. For some printing firms, this decision was a disaster because shortly after the price increase the nation-wide supply of paper became scarce. Those who reacted in panic and chopped inventory found that their shortage of paper resulted in lost accounts, soaring operating expenses and even lower profits.

Trends are only clues and should be considered together with other concrete facts. Remember that factors out of your or the industry's control may cause trends to reverse themselves at any time.

Assess The Printing Industry

Comparing financial relationships between your company and the PIA Ratio Standards permits you to size up your company's performance in relation to High Profit firms and the industry as a whole. The next section of this book provides detailed information on using the PIA Ratio Studies effectively. It is designed to help you begin to figure ways of improving those areas and operations that most need attention.

SECTION 2 - ANALYSIS OF THE RATIOS

VALUE ADDED - WHY IT'S IMPORTANT

If sales are up but profits are down, something is wrong. Even when sales are level and profits are lower, management has a problem. The problem area, in all probability, is in your Inside Sales, or Value Added. Too often printing managers are unfamiliar with this critical concept and do not realize this may be the root of their problem.

VALUE ADDED DEFINED

Value Added is the term for the sale of products manufactured in a company's plant. It is determined by subtracting the cost of materials and outside purchases from the sale price. In other words, Value Added is the value added to purchased materials and outside services by your manufacturing efforts.

SALES		$100
LESS: MATERIALS		
Paper	$22	
Other chargeable materials	6	
Outside services	7	35
VALUE ADDED		$ 65

VALUE ADDED MAXIMIZES PROFIT

Profit is achieved from sales of a company's own manufacture. This is a basic principle of accounting. Or, to put it more simply: you make your profit from the work done inside your own plant, not outside. When this key principle is ignored, printing firms ignore a valuable tool for earning maximum profits. There may be other reasons, of course, for poor operating performance, but neglect of the Value Added principle is the major and most frequent reason for low profits.

UNDERSTANDING VALUE ADDED

Value Added, the remainder after cost of materials is deducted from your sales, is all you have to pay your other expenses. These expenses include factory labor, factory expenses, administrative expenses, selling expenses and interest. When these expenses have been paid, what remains is your profit.

These expenses are, for the most part, fixed costs, and as "overhead" do not vary significantly. This is true when a company's operations remain within a steady range. They would change if there were significant growth or shrinkage in the company's size and operation. With "overhead" remaining relatively constant, you want to maximize your Value Added for greater profits. This is different from the basic "cost sheet concept" usually applied in the printing industry.

EXAMPLE -- HOW VALUE ADDED WORKS

This example illustrates the effect on operating income when we increase from $635,600 to $675,000 the Value Added derived from $1,000,000 of sales. We will assume that "overhead" (factory labor, other factory, administrative, selling and interest expenses) will remain the same. We are simplifying this example to prove that within this relevant range these expenses are, in effect, fixed costs.

	Original	After Increase in Value Added
SALES	$1,000,000	$1,000,000
Cost of Materials	364,400	325,000
VALUE ADDED	635,600	675,000
"Overhead"	591,000	591,000
Operating Income	$ 44,600	$ 84,000

THE BETTER STATEMENT

Statements of Operations have more meaning when they are prepared on the basis of Value Added. Too often, printers look to sales as the sole measure of profit when, in fact, Value Added is always the better measure. For example, both these results are possible for a printing operation in a given month:

	Result A	Result B
SALES	$125,000	$ 90,000
MATERIALS	60,000	15,000
VALUE ADDED	$ 65,000	$ 75,000

This example shows that a month's sales of $125,000 producing $65,000 of Value Added are not as good as the lower sales of $90,000 that provide $75,000 of Value Added. The lower sales total, in this case, produces $10,000 more to cover overhead...and increase profit. In this example the higher sales figures are misleading. Value Added gives a truer picture by clearing the distortion that material costs introduce into the traditional operating statement.

There would be significant differences in ratios based on percentages of sales in a comparison of operating statements for a short-run sheetfed company and that of a web-offset printer. The reason for the differences would be the amount of materials purchased and consumed by the web-offset printer, compared to the short-run sheetfed operation and the amount of direct labor incurred.

Comparison of ratios based on sales, as in Example 5, would seem to show that the web-offset operation has an 8.48% lower cost for factory payroll and factory expense (27.88% for web-fed as compared to 36.36% for sheet-fed). This is because a substantial portion of the sales of the web-offset company was materials.

EXAMPLE 5

	COMPANY S - SHEETFED		COMPANY W - WEB-FED	
		% of Sales		% of Sales
SALES OR VALUE OF PRODUCT PRODUCED	$1,000,000	100.00%	$1,000,000	100.00%
FACTORY COST OF PRODUCT				
MATERIALS				
Paper	197,300	19.73	387,900	38.79
Other Chargeable Materials	42,800	4.28	35,000	3.50
Outside Services	87,900	8.79	30,000	3.00
TOTAL MATERIALS	328,000	32.80	452,900	45.29
FACTORY PAYROLL	241,800	24.18	177,500	17.75
FACTORY EXPENSE	121,800	12.18	101,300	10.13
TOTAL FACTORY COST OF PRODUCT	691,600	69.16	731,700	73.17
GROSS PROFIT	308,400	30.84	268,300	26.83
ADMINISTRATIVE AND SELLING EXPENSES				
Administrative expenses	115,000	11.50	83,700	8.37
Selling expenses	72,500	7.25	58,000	5.80
TOTAL ADMINISTRATIVE AND SELLING EXPENSES	187,500	18.75	141,700	14.17
INCOME BEFORE INTEREST EXPENSE	120,900	12.09	126,600	12.66
Interest expense	18,300	1.83	18,300	1.83
OPERATING INCOME	102,600	10.26	108,300	10.83
Other Income	10,200	1.02	10,200	1.02
INCOME BEFORE INCOME TAXES	$ 112,800	11.28%	$ 118,500	11.85%

But comparing the ratios, based only on sales of these two companies, is much like comparing apples and oranges. The true comparison cannot be made until the distortion caused by the differences in materials is eliminated. In this circumstance, the difference in the cost of materials (45.29% for the web-fed company as compared to 32.80% for the sheet-fed company) is caused by the nature of web printing as compared to sheet-fed printing, rather than operating efficiencies. Now when we look at Example 6, which is based on Value Added, we see that factory payroll and factory expenses are 50.96% for the web-fed company as compared to 54.11 % for the sheet-fed company, a difference of only 3.15%.

EXAMPLE 6

	COMPANY S - SHEETFED		COMPANY W - WEB-FED	
		% of Value Added		% of Value Added
SALES OR VALUE OF PRODUCT PRODUCED	$1,000,000		$1,000,000	
FACTORY COST OF PRODUCT				
MATERIALS				
Paper	197,300		387,900	
Other Chargeable Materials	42,800		35,000	
Outside Services	87,900		30,000	
TOTAL MATERIALS	328,000		452,900	
VALUE ADDED	672,000	100.00%	547,100	100.00%
FACTORY PAYROLL	241,800	35.98	177,500	32.44
FACTORY EXPENSE	121,800	18.13	101,300	18.52
	363,600	54.11	278,800	50.96
GROSS PROFIT	308,400	45.89	268,300	49.04
ADMINISTRATIVE AND SELLING EXPENSES				
Administrative expenses	115,000	17.11	83,700	15.30
Selling expenses	72,500	10.79	58,000	10.60
TOTAL ADMINISTRATIVE AND SELLING EXPENSES	187,500	27.90	141,700	25.90
INCOME BEFORE INTEREST EXPENSE	120,900	17.99	126,600	23.14
Interest expense	18,300	2.72	18,300	3.34
OPERATING INCOME	102,600	15.27	108,300	19.80
Other Income	10,200	1.52	10,200	1.86
INCOME BEFORE INCOME TAXES	$ 112,800	16.79%	$ 118,500	21.66%

Almost every company's product mix is different. By using Statements of Operations based on Value Added, this product mix difference is eliminated. Value Added is always a better statement with which to evaluate your operations.

MEANINGFUL MARK-UPS FOR COST

With an understanding of the Value Added concept you can focus on materials mark-up to recover overhead. It is essential that materials are priced at their cost plus their proper share of the allocated overhead. Because Value Added is so

important to your profitable operation, overhead recovered by materials pricing must be correct. The traditional 5%, 10% or 15% mark-up of materials (so-called handling charges) may or may not be correct. You won't know for sure unless material costs are treated as another cost center, just as you have established a press cost center to determine the correct press hourly rate.

Once this is done, you will have a cost sheet that contains materials with their proper share of overhead and cost center costs. With this base information, you can apply the proper profit mark-up which is discussed below. Profit mark-up will vary as the relationship changes between materials and manufacturing.

PROFIT MARK-UPS -- VALUE ADDED CONCEPT

Profit mark-ups should take into account the Value Added concept; the higher the proportion of materials in a job, the higher should be the profit mark-up.

A sound profit mark-up policy is one that achieves and complements the business objectives of your firm. Printing firms should always seek to maximize their Value Added by attracting jobs with a high Value Added, and by converting low Value Added jobs to higher ones. Note this general rule: The most desirable jobs are those with high Value Added and lower profit mark-up. Conversely, jobs with a small Value Added are less desirable and should receive a higher mark-up.

There is no neat formula to separate good jobs from fair or poor jobs. What is presented here is an overall principle which you can integrate into your pricing procedures with little effort.

For example, let's look at a "good" job and a "better" job:

	GOOD JOB	BETTER JOB
Materials	$ 8,000	$ 2,000
Cost center costs	2,000	8,000
TOTAL	$10,000	$10,000

Before profit mark-up, the Value Added of the "good" job is only $2,000. Now price this job and include a profit. The "better" job has a Value Added of $8,000 before profit mark-up. Now, price this job with a profit mark-up.

If you followed the principle presented earlier, your prices should have included a higher profit mark-up for materials and cost centers in the "good" job and a lower profit mark-up for the "better" job. Why? Because the "better" job contributes more to fixed and variable overhead, and ultimately to profits.

VALUE ADDED AND SALES COMPENSATION

While it is generally accepted that sales people working on commission are more effective than salaried sales people, little attention is paid to the kinds of jobs they bring in. Commissions are usually based on total sales dollars, regardless of the Value Added component of the sale.

The weakness of this practice becomes clear when sales compensation is examined in light of the Value Added concept. Does a sales person have an incentive to bring in high Value Added jobs -- "better" jobs -- when he is paid a

commission solely on sales volume? No! What reward does a sales person look forward to when he seeks out and closes a high Value Added job? None!

Sales commissions should be a percentage of Value Added. Basing sales compensation on Value Added is becoming an increasingly popular policy among printing firms. It already has been adopted by some of the most successful firms in the industry, and for good reason. These sales people and their high Value Added jobs are contributing more to the profitability of their firm.

In these compensation plans, the commission on the Value Added in a job is calculated to be the same as the commission earned on an average job using an average amount of materials or outside purchases.

It might appear that sales commissions might be reduced if commissions were based on fewer Value Added dollars, but this is not the case. Commissions would be reduced only for those sales people who sell large amounts of paper and other outside services. Those sales people who sell high Value Added jobs, and who received no special recognition for these desirable sales -- those jobs with a significant amount of inside manufacture -- would now receive increased commissions.

The important motivation built into Value Added compensation is, of course, higher earnings for sales people who bring in higher Value Added jobs. The justification is that these jobs pay more overhead and produce a greater profit, contributing most to management's objectives.

"HOW WELL AM I DOING?" - ANALYZING YOUR REPORT ON OPERATIONS

REPORT ON OPERATIONS — WHAT'S IN IT FOR ME?

Every printing manager has to pause occasionally, step back, take a deep breath, and ask, "How well am I doing?" The answer to this question can be found in his firm's operating statement.

A financial statement is, generally, an historical document. It tells what happened in a particular year or series of years. But, by comparing, evaluating and analyzing his historical operating statement, the printing manager can open a window into the future...and more.

The effective manager uses the operating statement as an important tool in the decision-making process. Once historical data is accumulated and analyzed, the manager can form plans for the future, set objectives and attempt to control the outcome of those plans.

PIA Ratios are especially helpful in deciphering operating results. By comparing one's own company with other companies in the industry, problem areas are highlighted and identified. Since PIA Ratios are offered as "common size" or percentages, more precise comparisons can be made with other firms, regardless of different dollar sales volumes. Even closer evaluations can be made using PIA's specialized Ratio Study volumes, but the discussion in this Guide will deal with the book, All Printers by Sales Volume.

A WORD ABOUT RATIOS IN GENERAL

Ratios should be viewed as a starting point and as a powerful tool for more effective, profit-oriented management. By comparing your firm's ratios with those of PIA's high profit companies, you can pinpoint costs and expenses in your operation that should be examined in greater depth. You can get insights into operating trends through these comparisons and make intelligent judgments regarding their significance.

While making the comparisons you should keep in mind the peculiarities of business, technological changes and economic factors which might be affecting the results shown on the operating statements.

When variances occur between the objective (high profit standards) and the achieved (lower ratios in your firm's operating statement) or, if you find that your firm has better ratios than PIA's Profit Leaders, ask the following questions:

- Why did the costs differ?
- Was the difference adverse or favorable?
- Who or what was responsible for the difference?
- What can or should be done about it?

SAMPLE ANALYSIS OF THE OPERATING STATEMENT

The report on operations in All Printers by Sales Volume is arranged according to sales as follows:

All Firms Reporting
Sales to $250,000
Sales from $250,000 to $500,000
Sales from $500,000 to $1,500,000
Sales from $1,500,000 to $5,000,000
Sales from $5,000,000 to $10,000,000
Sales Over $10,000,000

Within each sales range, ratios are provided for All Firms and for Profit Leaders, those firms earning 8% or more profit on sales. Achieving ratios similar to those of the Profit Leaders should be a printing company's objective. We will direct our comparisons toward that goal.

Separate line items on the Report on Operations will be defined as they come up in discussion.

Pages 36-38 show a sample "PIA Ratio - Report on Operations and Supporting Schedules," and an operating statement for a fictional company, "Printemps."

Printemps, our fictional company, is a sheetfed offset printer. Its sales are $7,000,000 for the current year. The columns for the sales range, $5,000,000 to $10,000,000 have been taken from a PIA Ratio Study for our comparison.

The next step is to list the dollar amounts in Printemps' operating statement in the same order as the PIA Chart of Accounts. Now we are ready to convert Printemps' dollar figures to percentages of sales. When that is done, we can compare, side by side, Printemps' operating results with the PIA Ratio Study results.

You should compare in the same way your firm's percentages item-by-item with the Ratio Study results.

In our analysis, we will begin by listing what costs should be included in the various line items on the operating statement. Next, we will compare our fictional company, Printemps, with the results in the Ratio Study, discussing the major significant differences. Finally, we will try to analyze what caused the differences and suggest how the situation could be improved in the future.

SAMPLE COMPARISON

Sales Or Value of Product Produced

Reports on Operations start with sales, the amount you charge for your product. All cost-cutting practices are insignificant if you do not price your company's products intelligently. Printing is a made-to-order product. Every job is different and uses different facilities in your plant for varying periods of time. You must know your cost. To price your finished job intelligently, you also must have a good system for gathering those costs and formulating a sales price that is competitive and profitable. Printemps' sales are $7,000,000. Further analysis will help determine how well this firm is pricing its product.

Factory Cost of Product -- Materials -- Paper

Paper usually represents a printer's largest single cost on a job. Printemps' ratio for paper costs compare as follows:

PIA Profit Leaders	Printemps	Variance
25.01%	29.76%	(4.75)%

The variance is unfavorable. Printemps is spending much more on paper than PIA Profit Leaders. Some of the reasons for this might be:

1. Purchasing policies at Printemps need improvement.
2. Waste and spoilage are not controlled properly. It is extremely important that paper be handled properly in all phases of production -- shipment, storage, pressroom, bindery, etc.
3. The type and quality of paper required by the jobs that Printemps does could have an adverse effect on paper costs, as could product mix.

The effective manager will investigate these areas to find out where the problem or problems are occurring. Once this is done, he can take corrective action, if possible, to decrease the amount of money being spent on paper. If the problem is beyond his control and cannot be corrected, he will, at least, understand the reasons for this high paper cost.

Factory Cost of Product -- Materials -- Other Chargeable Materials

This line item on the operating statement has a supporting schedule (page 37) and includes the following:

	PIA Profit Leaders	Printemps	Variance
Ink	1.08%	1.50%	(0.42)%
Film	0.57	3.22	(2.65)
Plates	1.07	2.03	(0.96)
Other Chargeable Materials	2.12	1.02	1.10
	4.84%	7.77%	(2.93)%

Once again, Printemps has an unfavorable variance. It may have a general problem with inventory control which could be affecting all of its material costs. If Printemps has a system of perpetual inventory control, its managers should ask if it's working. Is there enough inventory on hand to prevent costs associated with rush orders? Is the purchasing department operating efficiently? Are prices compared periodically? Another area for inspection might be efficiency or inefficiency in handling materials. Are materials disappearing?

Printemps' variance of 2.65% for film is especially high. Management explains that Printemps has invested in a new scanner and is doing most of its own color separations, as well as some work for other area printers. This accounts for the Other Income which we will discuss later in our review of the Statement of Operations. Printemps also does predominantly high-quality color work, which contributes to its above average percentages for ink, film and plates.

This example of high material costs shows why management should not interpret variances on an isolated basis. You must keep in mind your business and how it operates as you go through your evaluation.

Factory Cost of Product — Materials — Outside Services

Outside Services are costs for work done by another company. The previous chapter in this guide, "Value Added -- Why It's Important" explains why it is beneficial for a printer to keep as much work in-house as possible. Printemps' ratios for Outside Services compare with PIA Profit Leaders as follows:

	PIA Profit Leaders	Printemps	Variance
Composition	0.67%	0.40%	0.27%
Offset Preparation	1.03	0.20	0.83
Printing	1.59	1.42	0.17
Binding	1.67	3.15	(1.48)
Other Outside Services	0.63	0.75	(0.12)
	5.59%	5.92%	(0.33)%

If we looked only at the percentages for total Outside Services, 5.59% for PIA Profit Leaders as compared to 5.92% for Printemps, we would only see a minor unfavorable variance of 0.33% and we might miss the larger variances both favorable and unfavorable in Offset Preparation and Binding.

Printemps does especially well in Offset Preparation because it does almost all of its own color separations. However, there is a weakness in its binding operation. This, again, is partially caused by the type of work that Printemps produces. Many of its jobs call for special types of binding processes for which it would be impractical to acquire the necessary equipment. There is, however, some new folding and stitching equipment that Printemps has ordered which will enable them to do more binding in-house. This move will improve their Value Added position and should increase profits.

Factory Payroll

Labor costs are always a large percentage of graphic arts sales. This is one area that can have a drastic effect on your operating statement's bottom line. Even though you may feel like a walnut caught in a nutcracker when dealing with rising labor costs, there are ways to ensure getting as much benefit as possible from the costs. Let's take a look at payroll:

	PIA Profit Leaders	Printemps	Variance
Salaries - Executive	2.04%	2.54%	(0.50)%
Direct Wages	15.86	18.84	(2.98)
General Factory Wages and Salaries	1.13	1.59	(0.46)
Packing, Shipping and Delivery	0.67	0.55	0.12
Payroll Taxes	1.27	1.68	(0.41)
Employee Benefits	1.91	2.08	(0.17)
	22.88%	27.28%	(4.40)%

Allocating Factory Wages between Direct Wages, General Factory Wages and Packing, Shipping and Delivery is always difficult. Remember that Direct Wages are earned by employees engaged in production (specific cost centers), and General Factory Wages and Packing, Shipping and Delivery Wages are for work not directly chargeable to jobs. It also may be more meaningful to analyze all Factory Wages combined to get an overall picture of how your company compares with the industry's Profit Leaders.

Printemps spends 4.40% more for Factory Payroll than the PIA Profit Leaders. Going down the list, we see that Executive Salaries are high. One reason for this may be that the factory executive is one of the principals in the business.

Printemps' major difference from Profit Leaders occurs in Direct Wages. Printemps' manager should review the following checklist to identify possible causes:

1. Is there a problem in the labor contract? Did managers calculate labor costs and negotiate intelligently?
2. Is there a good, working system in place for gathering job costs so that jobs can be priced realistically?
3. Is there an excessive amount of overtime? Does management know at what point overtime is, and is not, profitable?
4. Are vacations scheduled for slack periods?
5. Does management try to avoid idle time? Do employees wait around because of:
   - poor instructions
   - no material
   - no power
   - no repairman
6. Is production delayed while management makes decisions.
7. Even worse, is one job taken off the press to get a "rush" job through, thus causing extra make-ready time?
8. Do sales and manufacturing departments work together to determine which jobs have economic priority?

Because labor is so expensive, management has to watch it closely, and control costs tightly. Printemps is trying to do this by putting one of the firm's owners on the production floor. This will help keep lines of communication open between management and factory and should promote more efficient operation of the plant.

Factory Expenses

Our Chart of Accounts classifies Factory Expenses as Fixed and Other. Fixed Expenses are relatively constant regardless of a firm's level of productivity. Printemps' total Fixed Expenses compare as follows:

	PIA Profit Leaders	Printemps	Variance
Total Fixed Expenses	6.25%	7.64%	(1.39)%

The largest unfavorable variances in this classification occur in:

Depreciation - other	(1.17)%
Insurance	(0.50)%
Utilities	(0.42)%

The increase in Printemps' depreciation expense can be attributed to its recent purchase of a scanner. However, there is no obvious explanation for the unfavorable variance in insurance. Among the reasons could be the location of Printemps' plant, possibly in an area of higher risk or liability, resulting in higher insurance rates.

Management should review its insurance policies to see if there is proper coverage and to determine if it is getting the best available price. Printers should shop for the best deal for their insurance coverage which, like paper or any other outside purchase, is a product which varies in price. Judicious shopping can result in very substantial cost reductions for the same amount of coverage. No insurance policy should be agreed to until several brokers have been contacted for quotes. And, these policies should be reviewed regularly to see if even better terms can be secured.

Printemps also should be concerned about its utilities cost. Has there been a recent energy-saving review? Are machines shut down when not in use? Are the heating and air conditioning systems outdated and inefficient?

Other Factory Expenses vary with the level of production. Control of these expenses is important to increasing profits. Printemps needs improvement in some of the following areas:

	PIA Profit Leaders	Printemps	Variance
Factory Supplies and Expense	1.85%	2.39%	(0.54)%
Packing, Shipping and Delivery	1.15	0.92	0.23
Repairs and Maintenance	1.49	2.15	(0.66)
Other Factory Expenses	0.90	0.32	0.58
	5.39%	5.78%	(0.39)%

The variance of 0.54% in Factory Supplies and Expense may warrant inspection. Are supplies controlled and purchased effectively? Repairs and Maintenance also compares unfavorably with Profit Leaders. Printemps should review its maintenance policies to see whether proper maintenance schedules are followed. Are machines breaking down because of neglect or age?

Gross Profit

We have now reached the Gross Profit line in Printemps' Report on Operations. So far in our analysis we have discussed where significant variances appear and possible areas of improvement. The most controllable costs frequently appear above the Gross Profit line. Printemps' Gross Profit percentage is 15.85% compared to 30.04% for the PIA Profit Leaders. When Gross Profit ratios consistently fall below that of Profit Leaders, as is the situation with Printemps, management must examine problem areas closely and be prepared for considerable belt tightening. Gross Profit has to be high enough to cover Administrative and Selling Expenses, and pay for Interest Expense.

Administrative Expenses

Printemps has an average administrative staff. The President is the administrative executive and has kept good control of administrative costs, showing a lower cost than the PIA Profit Leaders.

	PIA Profit Leaders	Printemps	Variance
Total Administrative Expenses	8.22%	7.15%	1.07%

Some expenses that can be controlled in the Administrative area include office supplies and expenses, postage and telephone. These items should be monitored for effective purchasing and usage.

Bad debts are another area where management can improve results. One way to do this is to establish sound credit and collection policies, and see to it that those policies are followed.

Most administrative expenses are not significantly affected by changes in production or sales. The manager should try to determine if, overall, Administrative Expenses can be justified in terms of efficient operations.

Selling Expenses

Printemps' Selling Expenses also are low compared to PIA Profit Leaders.

	PIA Profit Leaders	Printemps	Variance
Total Selling Expenses	9.35%	6.57%	2.78%

This variance may not be as favorable as it appears. It may indicate that Printemps is not spending enough time and money to promote its products and to increase sales. There is one selling executive, four salesmen and one sales office person. Obviously, the president of the company also does some selling.

Interest Expense And Other Income

Printemps compares with PIA Profit Leaders in this area as follows:

	PIA Profit Leaders	Printemps	Variance
Interest Expense	1.46%	2.57%	(1.11)%
Other Income	1.29	1.59	0.30

Printemps' Interest Expense is high. Besides having fairly large long-term notes used to finance equipment, the company has been forced to seek some short-term working capital financing at high interest rates. It would be wise for it to improve its cash flow so that these short-term notes could be kept to a minimum. Proper planning and more efficient billing and collection procedures would help speed the cash flow.

In periods of falling interest rates such as we have been presently experiencing, printing management would do well to look into refinancing its indebtedness, both long-term and short-term.

Banks are not partners. They are in the business of selling money, and can be very competitive, especially in attracting new accounts. A printer can improve his profitability by seeking the best possible credit terms, and by regularly reviewing the credit terms available to him among competing lending institutions.

Other Income from outside separation work, mentioned earlier, helps Printemps' Income Before Income Taxes look better. Printers who do not have a cash flow problem would be wise to invest idle funds so that interest income can be generated.

The Bottom Line

We have barely scratched the surface in this brief example. In examining variances, it is often helpful to look at other parts of the PIA Ratio Study for more in-depth understanding. For example, when analyzing Direct Wages, an examination of the Significant Facts tables will show average wages in a particular sales range per employee. Managers should examine and analyze the Balance Sheet and Return on Investment sections together with the Operating Statement in order to get a full picture of a company's performance, compared to PIA Profit Leaders.

Once you have compared your results — all your results — with industry standards for the current year, and have identified the differences, you have the basis to plan and set objectives for the future. Proper understanding of the Ratio Study and diligent commitment on your part should result in improved operations. You already know how well you did last year. The next question is, "How can I do better next year?"

REPORT ON OPERATIONS - SALES = 100%

	SALES FROM $5,000,000-$10,000,000			
	ALL FIRMS	PROFIT LEADERS	PRINTEMPS	
	%	%	$	%
SALES OR VALUE OF PRODUCT PRODUCED	100.00%	100.00%	$7,000,000	100.00%
FACTORY COST OF PRODUCT				
MATERIALS				
Paper	25.66	25.01	2,083,200	29.76
Other chargeable materials	5.65	4.84	543,900	7.77
Outside services	8.02	5.59	414,400	5.92
TOTAL MATERIALS	39.33	35.44	3,041,500	43.45
FACTORY PAYROLL	25.90	22.88	1,909,600	27.28
FACTORY EXPENSES	12.18	11.64	939,400	13.42
TOTAL FACTORY COST OF PRODUCT	77.41	69.96	5,890,500	84.15
GROSS PROFIT	22.59	30.04	1,109,500	15.85
ADMINISTRATIVE AND SELLING EXPENSES				
Administrative expenses	8.54	8.22	500,500	7.15
Selling expenses	9.02	9.35	459,900	6.57
TOTAL ADMINISTRATIVE AND SELLING EXPENSES	17.56	17.57	960,400	13.72
INCOME BEFORE INTEREST EXPENSE	5.03	12.47	149,100	2.13
Interest Expense	2.21	1.46	179,900	2.57
OPERATING INCOME (LOSS)	2.82	11.01	(30,800)	(0.44)
Other income	0.72	1.29	111,300	1.59
INCOME BEFORE INCOME TAXES	3.54%	12.30%	$ 80,500	1.15%

SUPPORTING SCHEDULES - SALES = 100%

	ALL FIRMS	PROFIT LEADERS	PRINTEMPS	
	%	%	$	%
OTHER CHARGEABLE MATERIALS				
Ink	1.86%	1.08%	$ 105,000	1.50%
Film	1.22	0.57	225,400	3.22
Plates	1.34	1.07	142,100	2.03
Other chargeable materials	1.23	2.12	71,400	1.02
TOTAL OTHER CHARGEABLE MATERIALS	5.65%	4.84%	$ 543,900	7.77%
OUTSIDE SERVICES				
Composition	0.55%	0.67%	$ 28,000	0.40%
Offset preparation	1.36	1.03	14,000	0.20
Printing	1.25	1.59	99,400	1.42
Binding	2.81	1.67	220,500	3.15
Other outside services	2.05	0.63	52,500	0.75
TOTAL OUTSIDE SERVICES	8.02%	5.59%	$ 414,400	5.92%
FACTORY PAYROLL				
Salaries - executive	1.71%	2.04%	$ 177,800	2.54%
Direct wages	17.11	15.86	1,318,800	18.84
General factory salaries and wages	2.04	1.13	111,300	1.59
Packing, shipping and delivery wages	0.87	0.67	38,500	0.55
Payroll taxes	1.69	1.27	117,600	1.68
Employee benefits	2.48	1.91	145,600	2.08
TOTAL FACTORY PAYROLL	25.90%	22.88%	$1,909,600	27.28%
FACTORY EXPENSES				
Fixed Expenses				
Depreciation - real estate	0.29%	0.23%	$ 19,600	0.28%
Depreciation - other	3.19	3.44	322,700	4.61
Taxes - real estate	0.21	0.23	13,300	0.19
Taxes - other	0.23	0.22	11.200	0.16
Insurance	0.38	0.42	64,400	0.92
Building rent	0.97	0.64	-	-
Utilities - heat, light, etc.	1.22	0.99	98,700	1.41
Equipment rental	0.46	0.08	4,900	0.07
Total Fixed Expenses	6.95	6.25	534,800	7.64
Other Expenses				
Factory supplies and expense	2.00	1.85	167,300	2.39
Packing, shipping and delivery expense	1.11	1.15	64,400	0.92
Repairs and maintenance	1.37	1.49	150,500	2.15
Other factory expenses	0.75	0.90	22,400	0.32
Total Other Expenses	5.23	5.39	404,600	5.78
TOTAL FACTORY EXPENSES	12.18%	11.64%	$ 939,400	13.42%

SUPPORTING SCHEDULES - SALES = 100%

	ALL FIRMS	PROFIT LEADERS	PRINTEMPS	
	%	%	$	%
ADMINISTRATIVE EXPENSES				
Salaries - executive	2.30%	2.69%	$166,600	2.38%
Salaries - office	2.02	1.68	108,500	1.55
Payroll taxes	0.28	0.25	16,800	0.24
Employee benefits	0.59	0.74	35,700	0.51
Bad debts	0.48	0.41	22,400	0.32
Office supplies and expenses	0.43	0.31	24,500	0.35
Professional fees	0.49	0.37	29,400	0.42
Taxes - business	0.10	0.11	6,300	0.09
Telephone	0.43	0.45	32,900	0.47
Other administrative expenses	1.42	1.21	57,400	0.82
TOTAL ADMINISTRATIVE EXPENSES	8.54%	8.22%	$500,500	7.15%
SELLING EXPENSES				
Salaries - executive	1.10%	1.18%	$ 84,000	1.20%
Salaries and commissions - salesmen	4.60	4.83	221,200	3.16
Salaries - sales office clerical	0.74	0.72	28,000	0.40
Payroll taxes	0.33	0.29	21,000	0.30
Employee benefits	0.40	0.47	19,600	0.28
Advertising	0.47	0.88	14,000	0.20
Travel and entertainment	0.78	0.55	60,900	0.87
Other selling expenses	0.60	0.43	11,200	0.16
TOTAL SELLING EXPENSES	9.02%	9.35%	$459,900	6.57%

THE BALANCE SHEET - HOW WE STAND

A balance sheet is a statement of a company's financial position at a specific time. It lists assets, liabilities and owners' equity. The term, "balance sheet," comes from the fact that its two sides must balance or be equal. The balance sheet equation may take one of two forms:

Assets = Liabilities + Owners' Equity
OR
Assets - Liabilities = Owners' Equity

A company's assets are everything the company owns. Its liabilities are everything it owes. Owners' equity is what is left after liabilities are subtracted from assets, and it represents the financial interest of the proprietor, partners or shareholder(s) -- whoever owns the company. Another term for owners' equity is "net worth," a term that is not used as commonly as it was in the past.

A good printing manager should understand the relationship of a balance sheet's components to company operations. Many aspects of a company's operational capabilities are revealed by an evaluation of its balance sheet. As with other financial data, an intelligent analysis can provide a unique management tool.

Keep in mind that particular ratios and relationships may differ according to the processes a printing company uses or what products it produces. For example, it is likely that a web-offset printer would have a greater investment in plant equipment and, correspondingly, more liabilities (debt) or equity (owners' financial interest) to support those assets than a sheetfed printer.

By using the following analysis as a guide, you should be able to compare your own firm's financial position to that of the industry and Profit Leaders. Our example is the balance sheet of our imaginary company, Printemps, which we will compare to the sample PIA ratio balance sheet on page 49.

ASSETS - THE PRINTER'S INVESTMENT

How many dollars in assets should we invest to produce X dollars in profit? As any businessman knows, this is a difficult question to answer. Return on Investment (ROI), a measure of profitability that is just as important as Profit on Sales, has been defined as income divided by assets.

$$ROI = \frac{\text{Income}}{\text{Assets}}$$

There are only two ways to increase ROI: either increase income or decrease assets.

In our analysis of Printemp's balance sheet, our goal will be to ensure the efficient income-producing management of the company's assets. We also will look for ways to reduce assets without affecting income. As the above formula indicates, both goals will lead to higher Return on Investment (ROI).

Because printing is a highly capital-intense industry, there are many types of assets involved. These are normally classified as Current Assets, Fixed Assets, and Other Assets. Added together, these comprise Total Assets. We will examine each type of asset as it relates to printing.

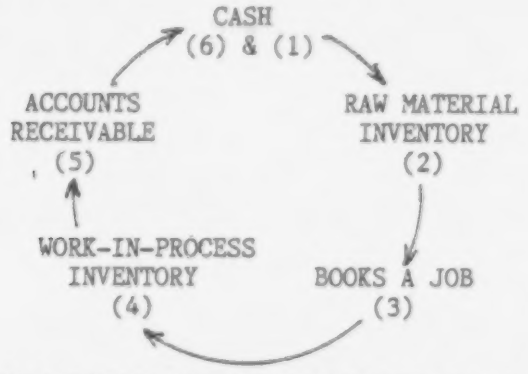
CURRENT ASSETS - THE PRINTER'S LIQUIDITY

Traditionally, Current Assets are listed on the balance sheet in their order of liquidity. They may be referred to as a company's liquid assets -- assets that can be converted quickly into cash, usually within a one-year period. A printer uses these assets to pay his bills or other debts as they come due.

Current Assets follow a circular pattern during the year, continuously being used up and replaced. For the average printer, this process takes place many times a year.

The typical trading cycle follows this pattern:

(1) A company starts with cash.
(2) Next, it purchases raw materials -- paper, ink, film, etc.
(3) Then it books a job and
(4) puts costs and materials into work-in-process.
(5) When the job is completed and shipped, it is then billed to the customer. The cost of the job is then removed from the work-in-process inventory and the billed amount becomes an account receivable.
(6) Finally, the customer pays the bill and the account receivable is converted back into cash and the cycle starts anew.



ONE OF THE KEYS TO GREATER PROFIT IS TO SPEED UP THE TRADING CYCLE, MINIMIZING THE TIME INVOLVED FOR EACH CYCLE. THE MORE CYCLES PER YEAR, THE MORE PROFIT GENERATED.

TURNOVER

Turnover is the time it takes to complete one trading cycle. Turnover that is as fast as possible, consistent with quality standards, is a sound management principle. But it seems to conflict with some printers' practices. Too often production, estimating and sales personnel seek extra time to do a job, even though the faster the job is done, the better the turnover. If management wants to increase its profits, it must insist that the trading cycle be completed as quickly as possible -- and manage its personnel to see that this policy is adhered to.

Two ratios are critical in analyzing the movement or rapidity of the cycle. These are inventory turnover and the collection period of receivables. It is imperative that printers understand how these two ratios operate and try diligently to improve them. Time after time, printing companies that have been sliding down the profit line have climbed back up to a healthy position by improving their turnover.

For example, one printing company forced into heavy short-term debt several years ago analyzed its operations only to discover that the collection period for receivables was approaching 63 days. After management installed tighter credit

policies and began to monitor collection procedures more closely, it took only a short time to reduce the collection period to 50 days and eliminate a major portion of the short-term debt.

Let's now analyze each current asset, generally, and then more specifically to see how Printemps' ratios compare to the industry as a whole.

CASH

There is no firm rule about the amount of cash a company should have on hand. The only thing certain is that having either too much cash or too little cash is likely to cause problems. A profitable company will have a surplus of cash after expenses. Conversely, a company facing financial loss will be pushed into using whatever cash it has to cover expenses. Also, a printing company that is growing or expanding will need more cash for plant investments and debt commitments, and for building sufficient inventories than will a company that is well established.

Historically, Profit Leaders maintain approximately 9% of their total assets in cash. Your company may need more or less, depending on its present situation.

CASH CONTROL

Cash control is particularly important to a printer because almost every transaction will eventually result in either receiving or disbursing cash. Because cash can be concealed and is liquid, it can be stolen or misappropriated more easily than any other asset. Keep in mind that theft and embezzlement have always been done by "trusted" employees or executives. Therefore, it is vital for management to maintain adequate control and accountability for its cash. The printing manager must see that the following procedures are carried out:

1. Cash is recorded and deposited promptly after receipt.

2. All disbursements are made by check. (It is common for printers to have a petty cash fund for small expenditures that would be impractical to pay by check. Just make sure the expenditures are small.)

3. Employees handling cash should have their tasks divided. They also should be bonded. For example, the person preparing invoices should not make bank deposits or handle receipts. The person writing checks should not reconcile bank statements.

At first glance, it may appear that Printemps has a serious cash deficiency. A comparison with the PIA Ratio Study shows 8.14% less cash than the Profit Leaders. Further analysis reveals that if both cash and receivables are totaled, the difference between Printemps and the Profit Leaders is only 4.92%. Printemps' cash as a percentage of total assets may point to a low receivable turnover and an inability to retain cash.

PERCENTAGE OF TOTAL ASSETS

	Printemps	Profit Leaders	Variance
Cash	6.50%	14.64%	(8.14)%
Accounts Receivable	31.82	28.60	3.22
TOTAL	38.32%	43.24%	(4.92)%

ACCOUNTS RECEIVABLE

There may be some reason for concern about Printemps' accounts receivable percentages. Remember, the balance sheet shows a company's financial picture only at a fixed point in time. It is possible that the accounts receivable are lower at other times in the sales year. But year after year, PIA Ratios have shown that firms like Printemps have a higher ratio of receivables to total assets on their balance sheets than do Profit Leaders. It appears logical to assume that the higher the sales, the larger the receivable balance. If a company's sales are increasing, there would be no cause for alarm. But usually that is not the case. High receivables may not be bad, but their cause should be investigated.

Among the possible reasons for higher accounts receivable is the tendency of many printers to rush "work-in-process" to completion at the end of the fiscal year so that the completed work will boost the "sales" category in their balance sheets. It also should be noted that web and sheet-fed printers who have long-run jobs may not be paid until the job is completed. When dealing with advertising agencies, printers may have to wait until the agency receives payment from its clients. In both instances, the wait can be long and costly, with high accounts receivable and slow cash collection periods.

PROMPT CASH COLLECTION

Let's go further into accounts receivable ratios. The time it requires to collect cash from customers after sales are made is referred to as the collection period of accounts receivable. The ratio between Printemps and Profit Leaders indicates how effective their collection procedures are. The sooner receivables are collected, the sooner the money can be put to use — to invest in more assets, to pay off liabilities, or to earn interest. As the collection period increases or decreases, it affects a company's cash, receivables, inventory, payables, and interest; in other words, it affects the company's entire operation.

The collection period is computed by dividing the average accounts receivable by the annual sales figure, and then multiplying the result by 365.

$$\text{COLLECTION PERIOD OF RECEIVABLES} = \frac{\text{AVERAGE ACCOUNTS RECEIVABLE}}{\text{ANNUAL SALES}} \times 365$$

This ratio reflects a company's credit and collection policies. Most printing firms have about one-sixth or 16.6% of their annual sales in accounts receivable. For example, if sales were $2,500,000, a typical firm would have $400,000 outstanding. Shortening the collection period reduces that portion of assets that are tied up in receivables and related interest costs.

PRINTEMPS' COLLECTION PERIOD OF RECEIVABLES..... 68.0 days

PROFIT LEADERS..... 62.4 days

Printemps' collection procedures need improvement to compare favorably with Profit Leaders. A collection period of 68.0 days is much too long. All printers, including Profit Leaders, should make every possible effort to shorten collection periods. Some ways to do this are:

1. BILL CUSTOMERS AS SOON AS THE JOB IS COMPLETED, not at the end of the month as many printers do.
2. Offer effective incentives for customers to pay on time.
3. Seek good, credit-worthy customers.
4. If good customers are consistently slow paying, take into consideration the cost of maintaining large accounts receivable balances when pricing their work.

Usually a small percentage of a company's accounts receivable will not be paid and thus become bad debts. To show a more accurate picture of what actually will be collected, accounts receivable appear on the balance sheet offset by an allowance for estimated losses.

AVERAGE RECEIVABLES

Although in most cases there is little difference between credit sales and total sales in the printing industry, the ratio of the collection period for receivables should be calculated using only credit sales. Printers, with the exception of quick printers, rarely have cash sales. "Average receivables" is the sum of beginning-of-the-year receivables and end-of-the-year receivables divided by two:

$$\frac{\text{BEGINNING ACCOUNTS RECEIVABLE} + \text{ENDING ACCOUNTS RECEIVABLE}}{2}$$

A better average may be derived by using the beginning of the year balance plus the end of each month's balance, divided by thirteen. The better an average you can calculate, the more accurate your collection period computation will be.

INVENTORY

A printer's inventory is the sum of work-in-process, paper and other chargeable materials and supplies. Finished goods inventory may be small or non-existent because the majority of a printer's sales are specialized, produced "to order" jobs.

While inventory may, at first glance, appear to be a simple and straightforward concept, inventory valuation methods vary among printers. The amount of a firm's inventory changes depending on the method used (FIFO, LIFO, etc.). Management must decide which practice is best for them.

Printemps' inventory represents 19.21% of its total assets, or 5.43% more than the Profit Leaders' inventory. It may or may not be carrying excessive inventory in stock. Either way, it should keep a perpetual inventory system. In addition, it should control and safeguard its inventory by taking a monthly physical count. Printemps' manager should make sure there are sufficient funds to pay current liabilities and that too much cash is not tied up in inventory.

Earlier, inventory turnover was cited as a critical ratio for improving a printer's trading cycle and increasing profits. The equation is:

$$\frac{\text{COST OF MATERIALS SOLD}}{\text{AVERAGE INVENTORY}} = \text{INVENTORY TURNOVER}$$

Printemps	Profit Leaders
3.34	3.67

The cost of materials sold is taken from the income statement, including paper and other chargeable material costs. Outside services, such as binding, are not included because they have no effect on inventory.

In those instances where customers supply paper, inventories will fluctuate and will possibly affect a printer's comparison of his inventory percentages to those in the Ratio Study. Parenthetically, when customers supply paper, a printer should still make a realistic handling and overhead charge for paper to cover his labor and warehousing costs, plus a profit mark-up.

Some financial analysts use sales of materials rather than the cost of materials in computing turnover. Since printers value inventories at cost, cost of materials sold gives a more accurate figure in calculating the ratio. Using the monthly average inventory is particularly important for printers because of the significant volume changes during the year. While a monthly inventory is, by far, the most highly recommended practice, some printers take inventory less often. If this is the practice in your plant, use the average annual inventory to calculate the ratio.

A low inventory turnover points to the possibility of a larger than necessary investment in inventory. A higher turnover implies better management and control. Printemps seems to be managing its inventory well.

WORK-IN-PROCESS TURNOVER

Managing work-in-process offers the greatest opportunity to improve inventory turnover. Profit potential is greater when a job is quickly shipped out of the plant, and rapid processing also enhances the company's capital position because less cash is tied up in inventory.

The formula for work-in-process turnover is:

$$\text{WORK-IN-PROCESS TURNOVER} = \frac{\text{COST OF PRODUCT PRODUCED (MATERIALS, LABOR, OVERHEAD)}}{\text{AVERAGE WORK-IN-PROCESS INVENTORY}}$$

Some printers have a fast turn-around from the time an order is put into production to its finished state. These firms will have less work-in-process. Other printers, because of the nature of their work, have a much longer production cycle and will have a significantly higher work-in-process inventory.

PAPER AND OTHER CHARGEABLE MATERIALS INVENTORY

Paper and other chargeable materials represent a substantial part of a printers' inventory. Inventory turnover improves when inventory levels are optimized and the storage time of materials (primarily paper) prior to production is reduced.

$$\frac{\text{PAPER USED}}{\text{AVERAGE PAPER INVENTORY}} = \text{PAPER INVENTORY TURNOVER}$$

$$\frac{\text{OTHER CHARGEABLE MATERIALS USED}}{\text{AVERAGE OTHER CHARGEABLE MATERIALS INVENTORY}} = \text{OTHER CHARGEABLE MATERIALS INVENTORY TURNOVER}$$

OTHER CURRENT ASSETS

Other current assets seldom play a significant role in ratio analyses because the percentages are usually small. Other current assets include various prepaid expense categories such as insurance, taxes, etc.

PROPERTY, PLANT AND EQUIPMENT

As mentioned before, printing companies must maintain a very high capital investment. New machinery costs are soaring. In many cases, used equipment is selling at prices close to the original new equipment price tag. As a result, equipment usually makes up a large portion of a company's assets. These assets are not for sale but are used in the operation of the plant. Property (with the exception of land), plant and equipment are depreciated over a period of time. Methods of depreciation vary; a printer usually uses one method of depreciation for tax purposes and another method for financial reporting or book purposes.

For book purposes, a printer may depreciate assets using the straight-line method over the estimated useful life of the asset. For tax purposes, printers may use the accelerated cost recovery system (ACRS) percentages as well as other methods to depreciate buildings and improvements, furniture and fixtures, machinery and equipment, and delivery vehicles.

	Printemps	Profit Leaders
NET PROPERTY, PLANT AND EQUIPMENT	39.12%	36.93%

Printemps' property, plant and equipment percentage is higher than that of the Profit Leaders. These percentages may vary considerably among different types of printers and different circumstances. For example, it may be advantageous for one printer to own his plant, while another printer living in a region with different real estate costs may be better off leasing his space. Machinery and equipment percentages may also vary widely depending on the processes each printer uses.

More important than the percentage of fixed assets owned, Printemps' manager should consider the following:

1. Is equipment being operated at capacity?
2. Is the company using outdated, inefficient equipment?
3. Can extra space held for future expansion be temporarily leased?

OTHER ASSETS

Other assets are usually those which will not be converted into cash within a period of one year. They may include deposits on equipment, the cash surrender value of officers' life insurance, and goodwill. Generally, other assets are not a significant part of the balance sheet.

LIABILITIES AND EQUITY

The liability and equity section of the balance sheet shows how each dollar of assets is distributed:

LIABILITIES ($) ----------> OBLIGATIONS

EQUITY ($) ----------> OWNERSHIP

Liabilities are divided into current and long-term liabilities. First we will examine Printemps' current liabilities, and then discuss its long-term liabilities.

CURRENT LIABILITIES

Current liabilities usually are obligations that fall due within a period of a year and are paid out of current assets. They include obligations generated by the operating cycle, such as money owed to vendors for materials and supplies, sales billed in advance of delivery, employees' salaries, interest, the current portion of principal payments due on notes, income taxes, and any other payable which is due in the next operating period.

	Printemps	Profit Leaders	Variance
Notes Payable	15.20%	5.88%	(9.32)%
Accounts Payable	17.26	10.97	(6.29)
Other Current Liabilities	10.02	11.05	1.03
	42.48%	27.90%	(14.58)%

It is obvious that Printemps has too much short-term debt. If the accounts receivable collection period is too long, as we have previously calculated, a situation may arise where Printemps does not have sufficient cash to pay its short-term creditors promptly.

Other current liabilities may include payroll taxes due, employees' withholding taxes, sales tax collected, accrued expenses such as interest, business taxes, payroll and vacation payroll, income taxes payable and others.

One current liability that printing firms often handle poorly is "Advance Collections." The following example shows how this account should be used.

A customer may ask for an advance billing, and the printer lists this as an Accounts Receivable and an Advance Billing account in his records. If this situation still exists at the Balance Sheet date, the original entry should be reversed and neither Accounts Receivable nor Advance Billing appear on the Balance Sheet.

When the customer pays, only the account "Advance Billing" is left, because the corresponding Receivable has been paid. In this case, it is necessary to reclassify the Advance Billing that has been paid as an Advance Collection. This Advance Billing situation occurs in many printing companies. Proper accounting is important.

DEFERRED INCOME TAXES

Deferred income taxes arise when income and expense items are reported for financial accounting and tax purposes in different time periods. For the majority of printing firms the principal difference is the use of accelerated depreciation for tax purposes. Generally accepted accounting practices require that taxes are provided on book profits, the amount of current tax is reduced and the balance is deferred.

LONG-TERM DEBT

Long-term debt provides a major source of funds to finance a printer's assets. It includes debt that will be paid some time beyond the current period (a firm's 12-month financial or operating year). Most of a printer's long-term debt is in the form of bank loans, mortgages or leases. Some large printers may issue bonds.

	Printemps	Profit Leaders	Variance
Long-Term Liabilities	25.32%	19.91%	(5.41)%

Again, Printemps' ratios show that it has too much debt. Perhaps Printemps' management has not pursued better financing methods. Has management considered issuing additional capital stock to obtain funds? Will Printemps be able to meet its financial obligations when they become due?

EQUITY

A company's equity is the amount of investment the owners have made in the company. The term "Proprietor's Equity" refers to the investment a single owner has in his unincorporated business. "Shareholders' Equity" is used when speaking of a corporation because corporations issue common stock. The owners of the common stock are the shareholders. The term "Partners' Equity" is used for a partnership. This discussion will be about "Shareholders Equity" because most printing firms are corporations.

Shareholders' Equity may include the following accounts:

Common Stock
Preferred Stock
Additional Paid-in Capital
Retained Earnings
Treasury Stock

CONTRIBUTED CAPITAL

The term "capital stock" is sometimes used to designate all of a corporation's issued stock, both common and preferred. The capital stock value is computed by multiplying the par value (original face value) of each share by the number of shares issued.

For example, if Printemps issued 2,500 shares of common stock and the par value is $10 per share, the total dollar value of common stock would be $25,000. (2,500 shares X $10 a share = $25,000.)

Stock does not have to be issued at par value. If shares are sold at a price higher than par, the additional funds received will appear as "Additional Paid-In Capital" on the balance sheet.

Preferred stock is another type of security a company may issue to raise funds. Issuing preferred stock is optional and many companies do not issue this kind of security.

RETAINED EARNINGS

Retained earnings are a company's accumulated profits (and losses) that have not been paid out to shareholders as dividends. The earnings are reinvested in the company in the form of assets (cash, accounts receivable, inventories, property, plant or equipment, etc.).

DEBT/EQUITY STRUCTURE

Printemps' percentage of Shareholders' Equity to all debt and equity is 32.20%. Its total debt percentage is 67.80%. The Profit Leaders' ratios are reversed -- their shareholders' equity percentage is higher than their debt percentage.

	Printemps	Profit Leaders
Total Liabilities	67.80%	47.81%
Shareholders' Equity	32.20	52.19

Many factors make it difficult to pinpoint the perfect debt/equity structure of a printing company -- the form of operations, the company's financial goals, the company's cost of capital, interest rates, etc. However, printing industry trends show that Profit Leaders consistently have a larger percentage of equity than debt.

TOTAL EQUITY AS A PERCENTAGE OF DEBT AND EQUITY

	PIA Ratio Studies*					
	1986	1985	1984	1983	1982	1981
All firms	37.84%	37.17%	39.32%	41.55%	42.18%	44.23%
Profit Leaders	53.23	50.42	55.25	57.89	54.88	54.08

* These ratios are from all firms reporting.

BALANCE SHEET

ASSETS	PRINTEMPS DOLLARS	PRINTEMPS % OF TOTAL ASSETS	PIA HIGH PROFIT STANDARDS ($5,000,000-$10,000,000) % OF TOTAL ASSETS	DIFFERENCE MORE (LESS)
CURRENT ASSETS				
Cash	$ 266,500	6.50%	14.64%	(8.14)%
Receivables	1,304,620	31.82	28.60	3.22
Inventories	787,610	19.21	13.78	5.43
Other current assets	65,600	1.60	3.89	(2.29)
TOTAL CURRENT ASSETS	2,424,330	59.13	60.91	(1.78)
PROPERTY, PLANT AND EQUIPMENT				
Real estate	1,150,050	28.05	15.01	13.04
Less: Accumulated depreciation	534,230	13.03	4.39	8.64
	615,820	15.02	10.62	4.40
Machinery and equipment	2,103,300	51.30	59.60	(8.30)
Less: Accumulated depreciation	1,154,150	28.15	35.82	(7.67)
	949,150	23.15	23.78	(0.63)
Other fixed assets	209,100	5.10	6.02	(0.92)
Less: Accumulated depreciation	170,150	4.15	3.49	0.66
	38,950	0.95	2.53	(1.58)
NET PROPERTY, PLANT AND EQUIPMENT	1,603,920	39.12	36.93	2.19
OTHER ASSETS	71,750	1.75	2.16	(0.41)
TOTAL ASSETS	$4,100,000	100.00%	100.00%	0.00%
LIABILITIES AND EQUITY				
CURRENT LIABILITIES				
Notes payable	$ 623,200	15.20%	5.88%	9.32%
Accounts payable	707,660	17.26	10.97	6.29
Other current liabilities	410,820	10.02	11.05	(1.03)
TOTAL CURRENT LIABILITIES	1,741,680	42.48	27.90	14.58
LONG-TERM LIABILITIES	1,038,120	25.32	19.91	5.41
TOTAL LIABILITIES	2,779,800	67.80	47.81	19.99
SHAREHOLDERS' AND PROPRIETORS' EQUITY	1,320,200	32.20	52.19	(19.99)
TOTAL LIABILITIES AND EQUITY	$4,100,000	100.00%	100.00%	0.00%

INTERRELATED RATIOS OF THE BALANCE SHEET

We will now examine ratios that relate to both sides of the balance sheet and, when evaluated with other ratios, offer significant information to the printing manager. Some ratios will include factors from both the operating statement and the balance sheet. These ratios provide the best information about the financial health of a company, if they are viewed together.

Four types of ratios will be used to analyze Printemps' financial position.

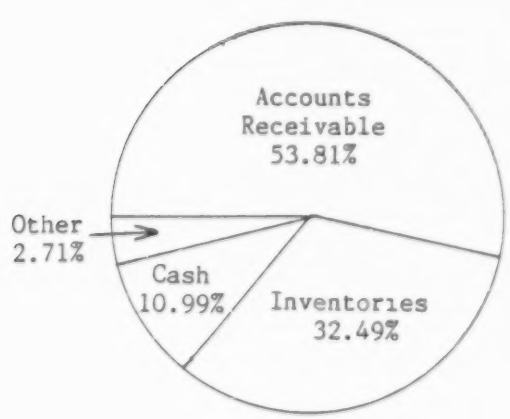
Type of Ratio	What It Does
1. Liquidity	Measures Printemps' capability to meet short-term obligations.
2. Activity	Measures Printemps' effectiveness in using its assets.
3. Leverage	Measures Printemps' ability to meet short-term and long-term debt.
4. Profitability	Indicates Printemps' return on assets.

LIQUIDITY RATIOS OF WORKING CAPITAL

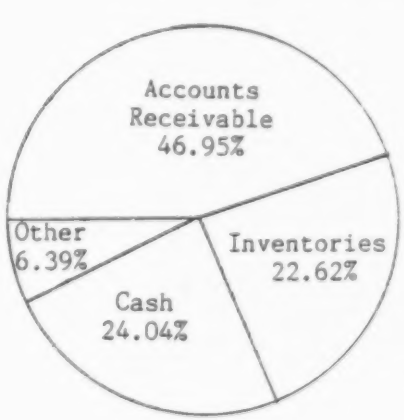
Adequate working capital is necessary for a company to meet current debts, carry sufficient inventories and take advantage of cash discounts.

WORKING CAPITAL
PERCENT OF CURRENT ASSETS

Printemps



Profit Leaders



These charts show that Profit Leaders have proportionately more cash and less receivables and inventory than Printemps.

Working capital is the difference between current assets and current liabilities. Printemps' working capital in dollars is $682,650.

Current Assets	$2,424,330
Current Liabilities	1,741,680
Difference - Net Working Capital	$ 682,650

Is $682,650 enough working capital for smooth operations at Printemps? Does Printemps have enough liquidity or too much? Does Printemps have too little cash? The following two ratios give us insight to the liquidity question.

> CURRENT RATIO - The current ratio measures a company's ability to meet short-term obligations, thus playing a key role in determining whether there is adequate working capital. It is computed by dividing current assets by current liabilities.

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Printemps	Profit Leaders
1.39	2.18

Printemps' ratio of 1.39 means that for every dollar of current liabilities, there is $1.39 in current assets. Historically, Profit Leaders have had current ratios above 2.0, and this has been considered satisfactory. Although many firms functioned well in the past with a lower ratio, today's companies tend to have longer inventory conversion periods and longer collection periods for accounts receivable.

Printemps' current ratio of 1.39 may indicate a cash shortage. There seems to be inadequate cash to pay short-term debts, a situation that needs immediate improvement. On the other hand, a very high current ratio might indicate that a printer is not using funds wisely. When current ratios are high, the company's assets may be used elsewhere more effectively, perhaps by buying additional machinery and equipment to expand or improve operations.

Some people say that doing business with other people's money, "trading on equity," is good business. This is rarely true. If the current ratio is lowered by too much debt, assets such as inventory and cash will not be available when needed.

Also, when working with an excessive amount of other people's money, a demand for cash repayment of the loan can prevent a printer from investing current assets profitably in his own business. It can prevent him from buying and discounting, and can affect his credit with banks which, in turn, can hinder the purchase of fixed assets. In short, working with other people's money makes the lender a partner who is mainly concerned with his money and interest, not your business.

QUICK RATIO - A better liquidity ratio is the quick ratio, also called the acid test ratio. The quick ratio differs from the current ratio because it eliminates inventories from Current Assets (the numerator). This is done because inventories are the least liquid of current assets, and sometimes distort the analysis. The formula for the quick ratio is:

$$\text{Quick Ratio} = \frac{\text{Current Assets Minus Inventory}}{\text{Current Liabilities}}$$

Printemps	Profit Leaders
0.94	1.69

Again Printemps shows the same weak position as in the current ratio since its inventories are high.

ACTIVITY RATIOS

Activity ratios indicate the effectiveness with which a company uses its assets. Inventory turnover and the collection period of receivables are Activity Ratios that were discussed previously.

LEVERAGE RATIOS

Leverage ratios reflect a company's total debt -- short-term and long-term. This ratio is important to a printing manager, particularly if his company is expanding and needs debt financing. He will want his company's leverage ratios to compare favorably with those of the printing industry. This is a factor that lending institutions will look at closely because it measures the relationship between shareholders' funds and borrowed funds.

Printers should consider the two debt-to-equity ratios analyzed below:

		Printemps	Profit Leaders
1.	$\frac{\text{Total Liabilities}}{\text{Equity}}$ =	2.11	0.92
2.	$\frac{\text{Long-Term Liabilities}}{\text{Equity}}$ =	0.79	0.38

The first debt to equity ratio shows that for every dollar in shareholders' equity, Printemps has $2.11 in liabilities. Profit Leaders, on the other hand, have only $0.92 in liabilities per shareholder dollar. It's hard to say what the perfect combination should be. Interest and principal payments usually make the use of borrowed funds riskier than the use of ownership funds. Dividends to shareholders are usually at the discretion of corporate directors and invested capital does not have to be repaid.

The second leverage ratio measures the proportion of long-term debt to equity. Again, no one can say what the acceptable ratio is for a particular company. The ratio for Printemps is 0.79 and for the Profit Leaders it is 0.38. Generally, the ratio has been rising steadily for all firms, and has been slowly decreasing for Profit Leaders. This trend seems to indicate that the Profit Leaders are becoming more financially secure, and that printing managers should try to obtain shareholders' equity as a source of funds.

It is clear, however, that Printemps' ratios are too high in both of these areas. They are highly leveraged and any adverse business climate could create substantial problems in the area of debt repayments.

PROFITABILITY RATIOS

Most of the profitability ratios are dealt with in the income statement. However, one major profitability ratio measures how effectively the company's investment (see balance sheet) has been used to produce that profit. This ratio is called the Return On Investment (ROI) and is discussed in a later section.

MEANING OF SIGNIFICANT FACTS

Significant facts in these ratios are particularly important statistics for printers. They are as meaningful as financial statements. Often, they offer the lowest common denominator which can be easily managed to produce higher profits.

INVESTMENT

Our objective in this section is to analyze assets used per employee. From the information found in the significant facts section, you will see that High Profit companies consistently invest more assets per employee. As sales volume increases, assets invested per employee also increase. Significant facts related to investment are defined and explained below.

Assets per Employee - All Employees = Assets (Net) / Number of All Employees =

This ratio includes all assets -- current, fixed (net of depreciation), and others. It indicates the adequacy of the funds employed.

Assets per Factory Employee = Assets (Net) / Number of Factory Employees =

This ratio is similar to the one above, but shows assets per factory employee.

Average Net Worth per Employee = Shareholders' Equity / Number of All Employees =

This figure tells what part of the first ratio (assets per employee) is funded by shareholders' investment.

Average Gross Plant Investment per Factory Employee = Plant Machinery and Equipment (Gross) / Number of Factory Employees =

This is a "key fact". It is obvious that the trend is toward more equipment per factory employee.

Net Worth Percentage of Fixed Assets = Shareholders' Equity / Fixed Assets (Net) =

This ratio indicates the relationship between funding fixed assets and shareholders' equity. Fixed assets should never be funded with current debt, but with long-term debt and shareholders' equity. This equity should also fund about 50% of all assets -- an indication of funding strength.

SALES

These ratios provide information on sales per employee. They are given twice; once including executives and then without the executives. Here we will discuss statistics which exclude executives. The following formulas are particularly interesting:

Sales per Employee	= Sales / Number of All Employees	=	This is an invaluable number. The only better ones are the two ratios below.
Sales per Factory Employee	= Sales / Number of Factory Employees	=	This is a refined number of sales produced per factory employee.
Sales Less Materials per Factory Employee	= Sales Less Materials / Number of Factory Employees	=	This ratio is the Value Added per factory employee — one of the most important ratios in the Ratio Study. You must know this number and plan to improve it; the end result will be improved profit.

EMPLOYEE DISTRIBUTION

This part of significant facts presents the distribution of employees by department on a percentage basis. For example, for all firms reporting in the PIA Ratio Study, the distribution is:

Factory	73.89%
Administrative	14.30
Sales	11.81
	100.00%

The most important element here is the percentage of factory employees. A firm with a disproportionate high number of factory employees and relatively too few administrative and sales employees is rare. Factory employees produce the product and their productivity generates revenue.

Often, a very simple analysis will provide an indicator of productivity. The question to ask is: Are there enough factory employees to produce the product, to support the overhead and provide a profit? This question may seem elementary, but in many cases the answer turns out to be a revelation.

Note that the percentage of factory employees is about 70% for very small firms, and rises to approximately 82% of all employees for the largest firms. Each sales class has a specific characteristic — a very simple, but valid relationship. Significant facts will help you determine whether your firm has too many or too few employees for the amount of business you do — and will point to possible weaknesses in your personnel structure.

SALES PER SALESMAN

This ratio is computed as follows:

$$\frac{\text{Sales Produced by Salesmen}}{\text{Number of Salesmen}}$$

To use this ratio properly, you must be very careful to refer to the PIA data that matches as closely as possible your firm's sales volume, product and process specialties.

In analyzing the significant facts section, we note that sales per salesman in a small firm is approximately $135,000. The figure rises to approximately $1,730,000 for firms with sales over $10,000,000. This rise occurs throughout sales classes.

You must zero in on your sales class and relate your figures to the product and process specialties in the other PIA books in this series. Data for publications printing will differ from that for commercial printing; data from web-offset companies will be different from sheetfed offset company data.

PAYROLL

Payroll statistics are computed in two ways. In the first way, data will include payroll taxes, fringe benefits and executive compensation. In the second way, payroll taxes, fringe benefits and executive compensation are excluded. Executive payroll will be carried as a separate section in the second category.

The first item is total payroll as a percentage of sales. This includes factory, administrative and sales payroll:

$$\frac{\text{All Payroll Costs}}{\text{Sales}}$$

This ratio is affected by a firm's size. Payroll as a percentage of sales shows a definite downward trend as the size of the firm increases.

The next ratio is factory payroll as a percentage of gross plant investment. It is computed as:

$$\frac{\text{Factory Payroll}}{\text{Machinery and Equipment (Gross)}}$$

On average, this ratio is 81%. That is, for every dollar of gross plant investment payroll costs are $0.81. This ratio requires careful evaluation because it doesn't necessarily tell the full story. If the company is fully equipped, a higher ratio would indicate a maximum use of equipment. However, even with inadequate plant facilities, it is possible to have a ratio greater than 81%. Again, careful evaluation is necessary to obtain correct answers.

Payroll per employee. This category provides a dollar amount of payroll per employee. This data is divided by factory, administrative and sales employee, and is presented for "All Firms" and "Profit Leaders" in each sales class.

Please note that, in some cases, Profit Leaders pay less per employee. However, don't think that higher profit is necessarily the result of lower payroll costs. While Profit Leaders have a lower relative payroll cost, we have established that the lower cost is related to a higher capital investment per employee and a greater Value Added per factory employee.

A separate subheading in this category deals with the payroll per executive compared to all employees, and then again, it is broken down in more detail per factory, administrative and sales executive.

PROFIT

Gross profit percentage is computed as follows: first, determine your gross profit (sales less the cost of goods manufactured). Then relate gross profit to sales.

$$\frac{\text{Gross Profit}}{\text{Sales}} = \text{Gross Profit as a Percentage of Sales}$$

	All Firms	
	All Firms	Profit Leaders
Gross Profit as a Percentage of Sales	23.29%	28.27%

Small and medium-sized firms require a higher gross profit percentage. In firms with up to about $10,000,000 in sales, the High Profit standard is approximately 29% of gross profit. For firms with sales greater than $10,000,000, the gross profit required becomes less because of relatively lower administrative and selling expenses.

Many printers search for a mystical formula to produce high profits. That formula need not be as mystical as they think. There really is a way to produce a higher gross profit which in turn leads to higher net profits. The sources of higher profit are in:

- Pricing
- Material costing and control
- Increased Value Added per factory employee
- Expense control

An excellent lowest common denominator with which to gauge your profit performance is the average gross profit per factory employee. It is computed as follows:

$$\frac{\text{Total Gross Profit}}{\text{Number of Factory Employees}} = \text{Average Gross Profit Per Factory Employee}$$

Another interesting statistic is average net profit before taxes per employee. For All Firms, this figure is $2,822 as compared to $9,811 for Profit Leaders.

Income before taxes as a percentage of sales, for all printing firms, was 3.33%; Profit leaders earned 11.94%. The percentage for All Firms is much too low, representing a dismal 6.47% Return on Investment. High Profit firms realized 15.39% Return on Investment.

After your bills are paid, where do you put your excess cash? Most of us put it where we can get the highest return, consistent with safety. If, for example, you could get 8% on U. S. Treasury Bonds, you wouldn't be satisfied with a 6% return. Yet, the average printing firm produces only a 6% Return on Investment.

Return on Investment (ROI) refers to the capital used to produce income. It is a very simple computation:

$$\frac{\text{Income}}{\text{Assets}} = \text{Return on Investment (ROI)}$$

ROI Ratios: All Firms - 6.47%; Profit Leaders - 15.39%

Return on Investment (ROI) incorporates the two major factors in measuring profits -- income and investment. For this reason it is considered the most comprehensive measure of profitability. There often is disagreement as to whether net assets or gross assets should be used to compute ROI. A more detailed explanation is presented in GROSS ASSETS VS. NET ASSETS (page 60).

ROI is gaining more and more acceptance as a measure of profitability in printing companies. This is due to the fact that printing is a capital intense industry and printing firms generally have high fixed assets against which their profit performance is measured.

PIA is a strong advocate of the ROI concept and consistently urges that its members become familiar with it and use it to measure their company's performance. Since ROI was introduced in the 1967 PIA Ratio Books, the Individual Computer Printout has been expanded to include ROI, an entire annual PIA financial meeting has been devoted to the concept, and PIA conducted a special historical case study on ROI. This study revealed a decline in investment turnover and showed the effect of this decline on the ROI rate when there is not a corresponding increase in profit as a percentage of sales.

DEFINING RETURN ON INVESTMENT

The ROI ratio produces, as a percentage, an annual rate of return on assets used to produce income. It is the same as an annual interest rate that one would receive on a bond or other type of investment.

The simple ROI formula is a reduction of the following ratios:

$$\frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} = \text{ROI}$$

or,

$$\frac{\text{Income}}{\text{Assets}} = \text{ROI}$$

The first fraction is income as a percentage of sales (income divided by sales). This is the percentage which requires special attention to improve your ROI. We will discuss this further under the heading, "Return on Investment Dilemma."

The second fraction is called "investment turnover" or "asset turnover" (sales divided by assets).

Although in the original formula, "sales" in the denominator of the term, "income as a percentage of sales," and the "sales" in the numerator of "investment turnover" cancel out each other mathematically, it is important to consider these two fractions as dynamic elements in ROI management.

Here is an example of an ROI computation:

Sales	$1,000,000
Profit before Taxes	90,000
Assets	500,000

$$\frac{\$\ 90{,}000 \text{ Income}}{\$1{,}000{,}000 \text{ Sales}} \times \frac{\$1{,}000{,}000 \text{ Sales}}{\$\ 500{,}000 \text{ Assets}} = \text{ROI}$$

$$9\% \times 2 = 18\% \text{ ROI}$$

In the PIA Ratios, income is...

...income before interest expense, other income and taxes.

Assets are...

...gross assets employed before deduction of accumulated depreciation and amortization.

As these are not commonly used definitions, we will discuss them in more detail.

Income Before Interest, Other Income and Taxes. When we refer to income in the PIA Ratio Study we mean income before interest, other income and taxes. Other financial studies compute ROI on after-tax profit. Their reasoning is that taxes are expenses, just like any other expenses. However, since the amount of tax varies so widely from one situation to another, tending to distort any comparisons, computing ROI before taxes provides a more meaningful standard.

By using profit before interest expense, we are able to compare the Return on Investment from operations, excluding interest which is really a cost of raising capital. For example, if your Return on Investment is 18% and your cost of interest is 12%, it pays to borrow funds which will, in turn, produce a greater return. Conversely, it would not pay to borrow funds at an interest rate greater than your ROI. It becomes clear that if interest were deducted from gross profit before determining ROI, one could not make a valid comparison between ROI and the cost of capital.

Non-operating income and expenses normally are excluded from our calculations. It is important that you also remove non-operating assets from your investment figure.

DEPRECIATION

Some printers, for financial or tax reasons, compute depreciation by accelerated depreciation methods. This produces higher depreciation in the early years of an asset's life than does the straight-line method. If your company uses an accelerated depreciation schedule, the excess depreciation should be added back into profit in order to compute ROI.

Some people theorize that depreciation should not be deducted from income for ROI purposes because accumulated depreciation is not deducted from fixed assets in arriving at total investment or assets. However, this concept does not have too many advocates.

VALUATION OF ASSETS

There are four ways to look at asset-valuation bases:

- Gross Assets at Book Value - Assets are at their original cost without deduction for accumulated depreciation.

- Net Book Value - Assets are valued at original cost less accumulated depreciation.

- Replacement Value - This is the same as Gross Assets, but adjusted for the difference in their replacement cost.

- Market or Actual Cash Value - Similar to Net Book Value, but asset costs have been changed to reflect replacement cost less the proportional accumulated depreciation.

Each of these ways of valuing fixed assets has considerable merit. The Replacement Value and the Replacement Value less Accumulated Depreciation are approaches you may want to use on your own as they can be very meaningful, depending on your circumstances and objections. For internal management purposes use the most accurate value of your equipment that you can. In these PIA Ratio Studies, however, we are limited to determining ROI by Gross Assets at Book Value and Net Book Value.

GROSS ASSETS VS. NET ASSETS

ROI has substantially different results when computed on Gross Assets and on Net Assets. For a number of years, the PIA Ratio Studies have determined ROI based on Gross Assets. This is the so-called DuPont method, which has the advantage of alerting management when ROI begins to decrease and equipment needs to be replaced.

Under the Net Asset method, a higher ROI may justify continued use of existing equipment. The Gross Asset basis has its purpose, but it is not as accurate as the Net Asset method.

ROI based on Net Assets is computed as follows:

$$\frac{\text{Income Before Taxes, Interest, and Other Income or Expense}}{\text{Assets Less Accumulated Depreciation}}$$

For "All Firms", this is 9.44%; for "Profit Leaders", 21.14%.

The net asset method may produce a more valid operational ROI and a more accurate computation.

WHAT IS A FAIR ROI?

The "All Firms" ROI of 6.47% on gross assets and 9.44% on net assets is hardly adequate to justify investment. The "Profit Leaders" ROI is 15.39% on gross assets and 21.14% on net assets. High-profit companies appear to achieve an ROI more commensurate with the economic risk.

There are substantial risks in the printing industry and, therefore, the return related to that risk should be significantly higher than prevailing interest rates. Generally, a fair ROI should exceed 20% on a new-asset venture, or 30% on net assets.

RETURN ON INVESTMENT DILEMMA

Because ROI is determined by multiplying "Income as a Percentage of Sales" by "Investment Turnover", it appears that we could increase our ROI by increasing one or the other factor, or both. This is true. But some background is necessary first. We will limit our statistics to the Profit Leaders.

Currently, the investment turnover for Profit Leaders is 127.00%. This means that these firms achieved $1.27 in sales for every $1.00 of assets employed. Let's look at the recent historical record of investment turnover.

1986	127.00%
1985	129.87
1984	131.54
1983	131.84
1982	141.56
1981	142.49
1980	141.42

Until 1982, investment turnover remained rather steady. Since then, however, there has been a downward trend in the investment turnover. The increasing capital cost of printing equipment accounts for this downward trend. By comparison, the income for Profit Leaders has remained fairly level during this period. Therefore, as the cost of equipment increases, the need for increased income becomes necessary to achieve and maintain a fair Return on Investment.

The following example explains how this would apply to your firm:

	Old	New
Equipment.....	$ 50,000	$200,000
Investment Turnover.....	200%	140%
Desired Return on Investment.....	20%	20%

Return on Investment = Investment Turnover x Profit as a Percentage of Sales.

					Profit Needed As A Percentage of Sales
ROI	=	Income / Sales	x	Sales / Assets	
Old 20%	=	$ 10,000 / $100,000	x	$100,000 / $ 50,000	10%
New 20%	=	$ 40,000 / $280,000	x	$280,000 / $200,000	14.3%

To maintain the desired 20% ROI, you would need a profit of 14.3% on sales with the new equipment, compared to a 10% profit on sales with the old equipment.

There are two traps to avoid in ROI:

1. When you increase your working assets, such as equipment, you must also increase your profit as a percentage of sales to maintain a fair Return on Investment. If you don't, your ROI will suffer.

2. Your new selling price with a higher profit mark-up may be lower than your price using the old equipment. The new equipment should produce a lower unit selling price despite the higher cost rates and higher required profit margin, because the new equipment should be more efficient. If this is not true, there is no economic justification for replacing old, less expensive, (less capital intense) equipment with new, more expensive (more capital intense) equipment.

YOUR ULTIMATE GOAL: THINKING ROI

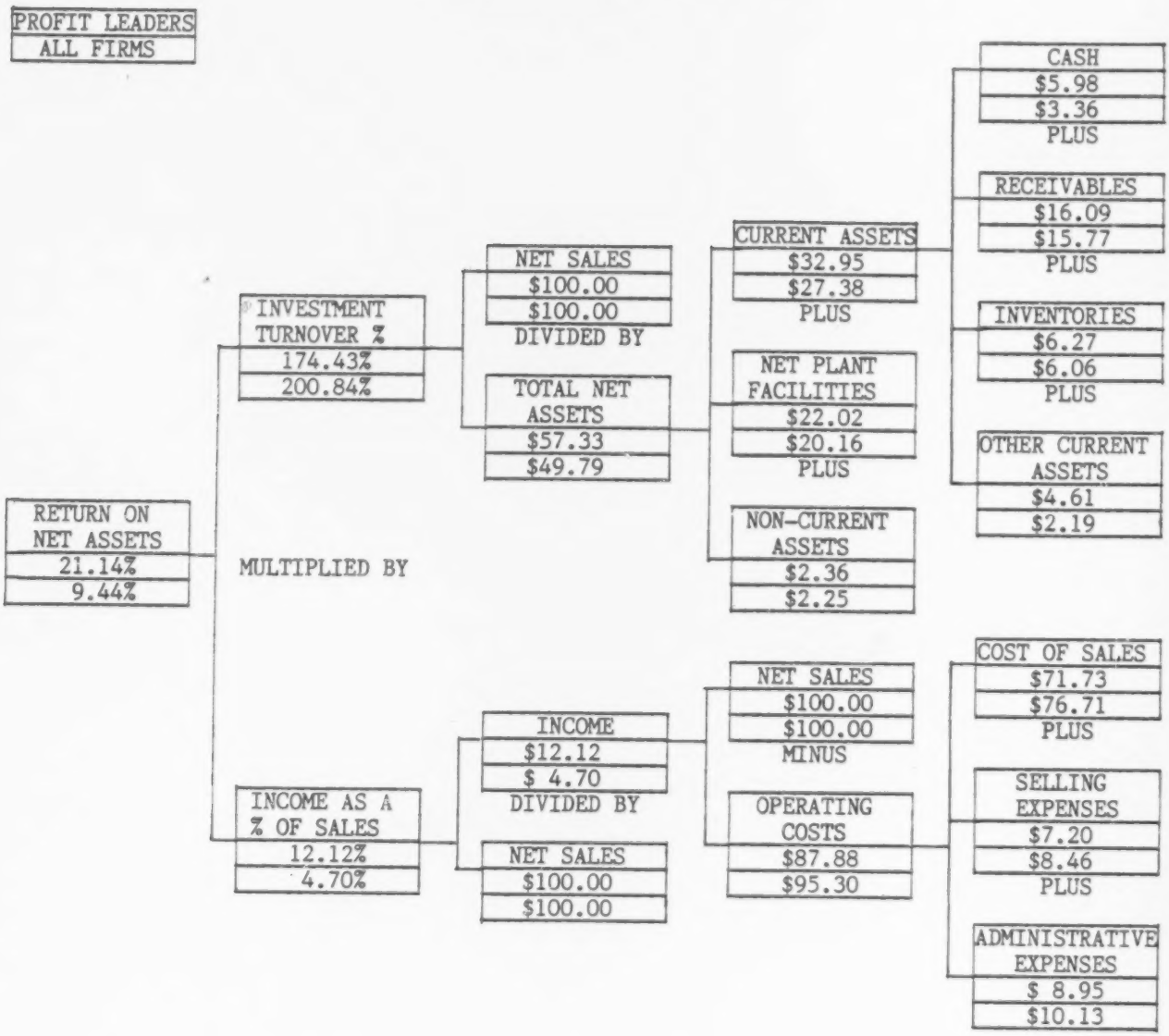
Thinking ROI is like working backwards. Thus, a knowledgeable printing manager might plan along these lines:

1.	Capital to be employed		$400,000
2.	Desired ROI: 20% of capital employed		80,000
3.	Sales to be achieved from new assets employed: 140%		560,000
4.	Required profit as a percentage of sales:	$\frac{\$\ 80,000}{\$560,000}$	= 14.3%

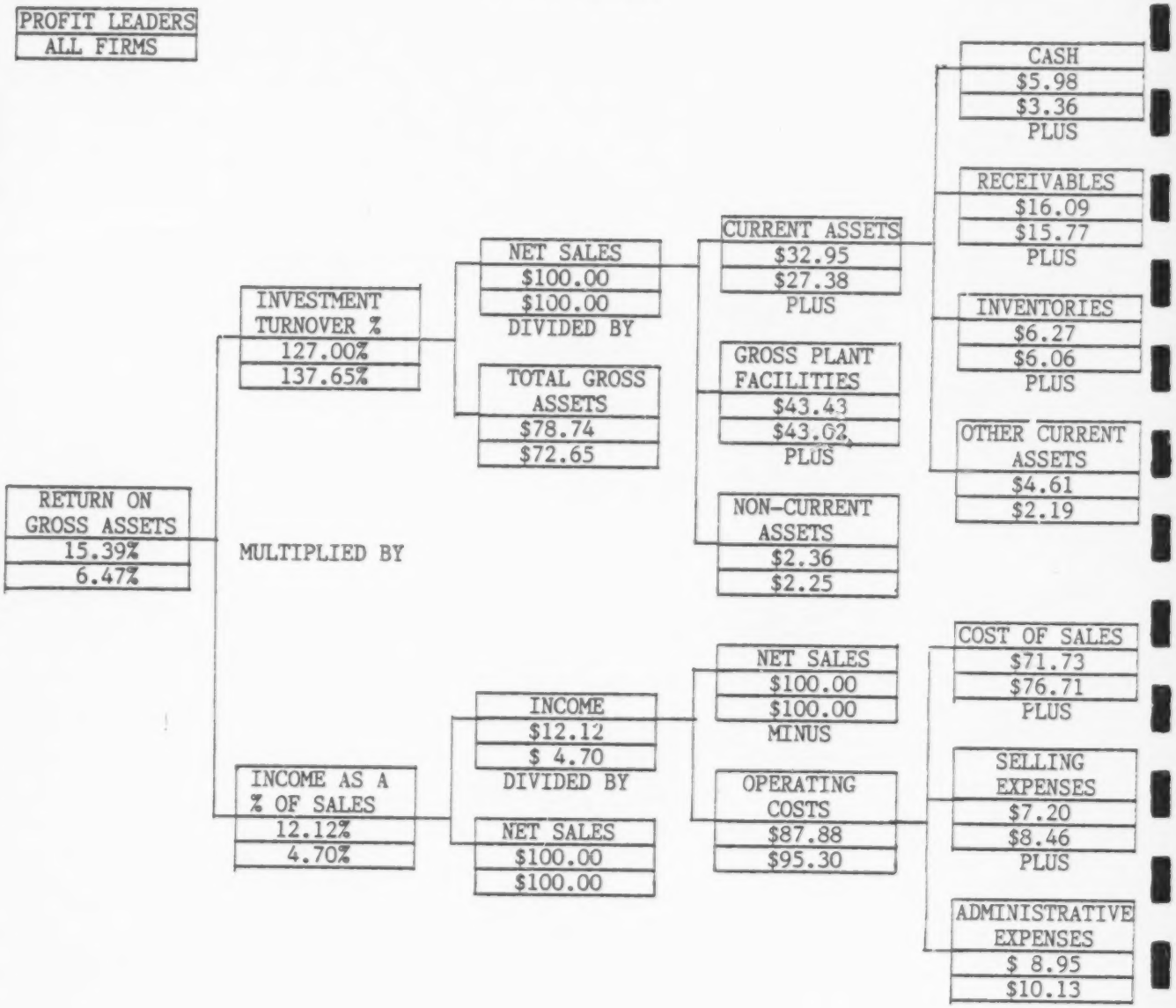
This example shows that you must strive for a 14.3% profit on sales to produce a 20% ROI on the capital you employ.

In conclusion, while profit as a percentage of sales must be maximized, make every effort to increase the investment turnover and thus derive a strong Return on Investment.

RETURN ON INVESTMENT CHART - BASE: $100 OF SALES
(NET ASSETS)



RETURN ON INVESTMENT CHART - BASE: $100 OF SALES (GROSS ASSETS)

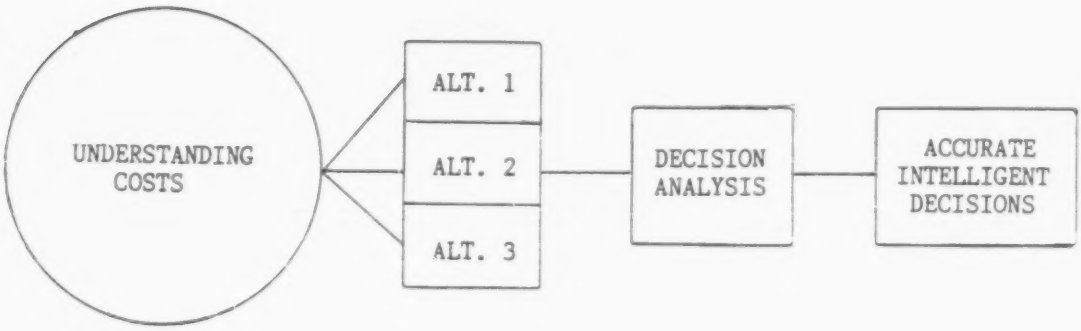


A BREAK-EVEN ANGLE TO COST/VOLUME/PROFIT

Costing and pricing decisions can "make or break" a printing manufacturer. The printer is faced constantly with decisions about selling prices, fixed costs and variable costs. These decisions can be made intelligently if the printer fully understands and uses pricing techniques and cost-volume-profit relationships.

Of course, there are some factors a printer cannot control. Competition and market pressures will influence pricing decisions. Likewise, although costs do not determine the sales price, they do influence what that price will be. Understanding cost behavior enables the printer to make accurate predictions, thus ensuring good pricing and other financial management decisions. Using these concepts, a printer can more easily answer questions such as:

What printing techniques are most profitable?
Are we charging enough?
Should we concentrate on web sales?
Are we getting the most out of our press?
Could we expand? Should we expand?



COST KNOWLEDGE

Break-even analysis is the springboard to understanding cost behavior and the printer equipped with good cost knowledge will be able to manage and control expenses more efficiently. Throughout this discussion, keep in mind that printing is highly specialized and normally does not have "shelf items" to sell. Also, we must recognize that while break-even analysis may be of more benefit to some printers than to others, all printers will be able to utilize its basic concepts in making good financial decisions. A printer may use the analysis on a job-by-job basis to determine whether to accept or reject certain jobs, or may use it to project one-year operating results for the company. Similarly, the analysis may provide good answers to other key questions.

BREAK-EVEN POINT

The break-even point is the point at which sales and expenses are equal, that is, the point at which the profit is zero.

B/E POINT: SALES - EXPENSES = $0.00

A printer obviously wants to do better than break even. There would be no point to remaining in business if this was all he could look forward to. Break-even analysis encompasses much more than breaking even. It can determine what volume of printing must be generated and sold to reach a desired income level. It also can determine which jobs are profitable, and which are not.

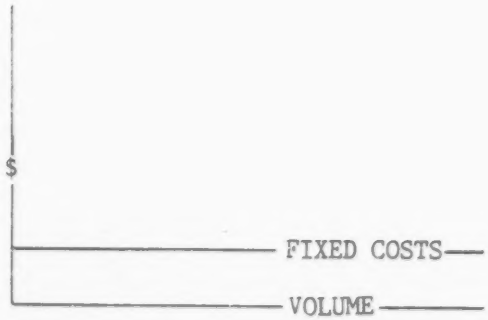
Before we discuss the break-even point further, let's consider the two terms, "sales" and "costs." The term, "sales" needs no explanation; the more the better (assuming they are profit-yielding sales). Fortunately, printing sales volume has been on an upward trend and is expected to continue rising. On the other hand, costs are also rising. This is the area we must understand and manage effectively in order to stay ahead.

COSTS

A printing manufacturer will have many costs. Some will vary in direct proportion to the volume of printing produced. Other costs will remain relatively fixed over a period of time. Some expenses contain both variable and fixed elements. It is important for the printer to identify and segregate these costs to understand how they influence profits.

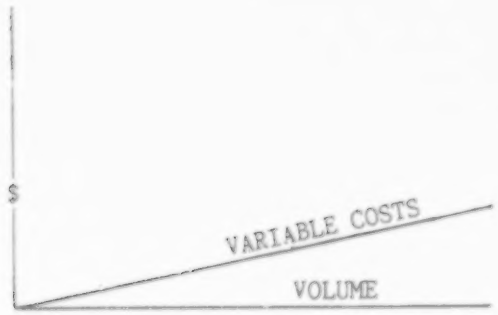
Fixed Costs

Fixed costs are expenses that remain the same regardless of the level of output over a period of time. Rent, depreciation, supervisors' salaries and real estate taxes are just a few examples. Those fixed expenses listed in the PIA Ratio Study's section on Factory Expenses are identified and segregated. (See PIA Supporting Schedules in the Income Statements, page 37.)



Variable Costs

Paper, ink and direct wages are examples of a printer's variable costs. As the volume of printing increases, these costs will rise proportionately.



Mixed Costs

CAUTION. Recognize the fact that some expenses cannot be neatly placed in the fixed or variable category. There are expenses that may vary with production at a certain point in time, but not in direct proportion. For example, one printing supervisor may be able to oversee the work of the press department up to a certain volume of production. If sales volume increases appreciably, a second supervisor may have to oversee the additional volume of printing.

Conversely, if the volume of printing decreases, but only temporarily, there may be no need to reduce production staff. However, if the drop in volume is considered permanent, a supervisor may have to be laid off. Therefore, in the short run, supervisory salaries are considered fixed; in the long run, they may be variable.

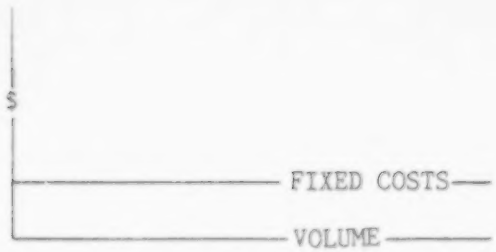
For this analysis, we will assume all costs can be classified clearly as fixed or variable. Normally, within a period of a year, one can accurately predict fixed and variable costs.

GRAPHING COSTS AND SALES

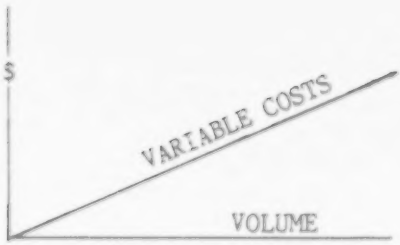
Combining fixed costs, variable costs and the sales line on a graph emphasizes the break-even point. Graph number 4 below shows that once the break-even point is reached in sales volume (fixed costs are covered), additional sales produce profits.

GRAPHING COSTS AND SALES (Continued)

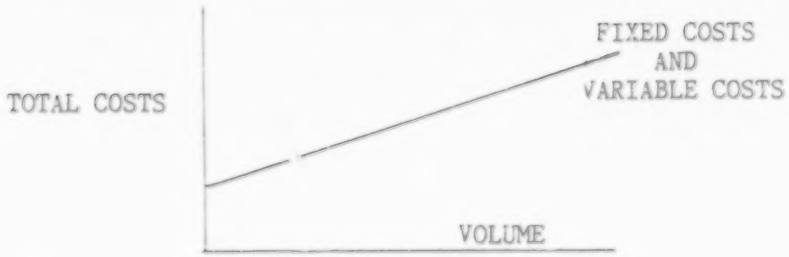
1. Fixed Costs



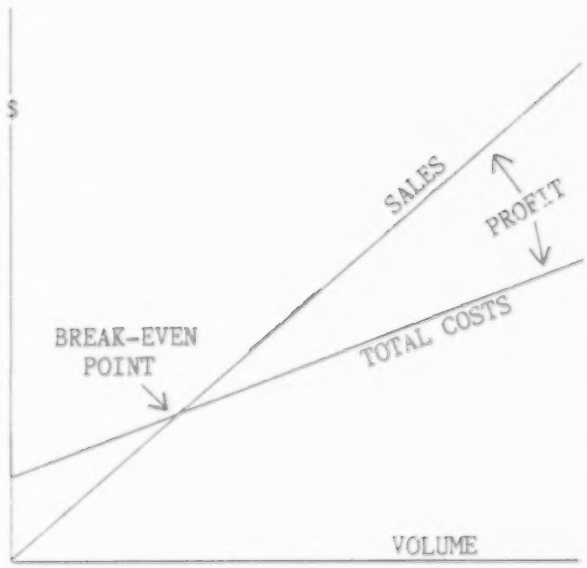
2. Variable Costs



3. Fixed and Variable Costs Combined



4. Break-even Graph



The graphs above assume that volume is the only factor influencing cost.

BREAK-EVEN ANALYSIS

How much printing must be sold to break even? What volume of printing must be sold to reach a target level of income? In printing, volume may be based on units (or thousands of units) of production, impressions per hour, dollar volume of sales, or other measures. For our simple illustration below, we will assume volume is based on thousands of units of production.

> Printer Smith would like to know what volume of printing he needs to break even. He has segregated his fixed and variable costs for the preceding year and has estimated what they will probably be in the current year. He has found that his total fixed cost will be approximately $500,000. His average sales price is $250 per thousand of units produced, and his variable costs are $175 per thousand of units produced.

To find Smith's break-even point, he would use the break-even point equation and let X equal the number of thousand units needed to break even.

B/E Equation: UNIT SALES (in thousands) = VARIABLE COSTS + FIXED COSTS
$250X = $175X + $500,000
X = 6,667 THOUSANDS OF UNITS

So, Printer Smith would need to sell 6,667 thousands of units (or 6,667,000 units) of printing to break even.

> Next, Printer Smith would like to know what volume of printing he needs to match the average PIA Profit Leader's income level. (Historically, PIA Profit Leaders achieve an average of 12% income before taxes as a percentage of sales.)

The equation he will now use is:

UNIT SALES (in thousands) = VARIABLE COSTS + FIXED COSTS + DESIRED INCOME
$250X = $175X + $500,000 + .12($250X)
X = 11,111 THOUSANDS OF UNITS

Therefore, if he sold 11,111,000 units, he should expect his income before income taxes to be 12%.

Keep in mind that Printer Smith's break-even analysis was based on a particular set of assumptions. If his conditions change, a whole new set of cost-volume-profit relationships would appear.

OTHER APPLICATIONS OF BREAK-EVEN ANALYSIS

Break-even analysis also can provide other helpful information, particularly in budgeting and forecasting. Printer Smith is considering a new plant layout and expansion. If he follows through with this plan, his fixed and variable costs may change considerably. To find out how much, he could plot his various levels of expected production together with expected changes in his fixed and variable costs, and then analyze results at various levels of production.

He also can use the break-even approach on a job-by-job basis. Some jobs are accepted for reasons other than profit. These reasons might include filling in slack press time with a no-profit or low-profit job (bringing in cash for fixed expenses). Yet, to predict exactly how much income a particular job is adding to profits, the break-even analysis is very enlightening.

THE INVENTORY DECISION - LIFO VS. FIFO

Printers struggle to dam the tide of red ink and to produce a profit. Lately, another hidden menace has been gnawing away at after-tax income: the higher replacement costs of materials and supplies.

A printer claims a 12% profit on a $1,000 sale if expenses, including materials, supplies, factory payroll and overhead, interest, administrative and selling expenses, total $880. But is this really true? Does he really have a 12% or $120 profit?

In manufacturing his product, he used a substantial dollar volume of materials and supplies -- paper, ink, photographic materials, plates, etc. -- and now he must replace them. In the meantime, the purchase price of those supplies and materials has increased. (Who can cite a case where the cost of materials and supplies have decreased?) Where does the additional money come from? The answer is easy: the difference in replacement costs must be taken from the $120 profit.

There is not much a printer can do about rising replacement costs, but proper accounting methods for the inventory of materials and supplies can save substantial tax dollars. These lowered taxes translate into money that can be used to soften the blow of higher replacement costs. And the more those replacement costs increase, the more tax dollars are saved.

The two most common inventory methods in use today are FIFO (First In, First Out) and LIFO (Last In, First Out). Both methods are accounting tools to describe the flow of materials and supplies for financial statement and tax purposes only. Neither has an effect on the actual replacement of materials and supplies.

The majority of printers use the FIFO method of inventory valuation. This provides them with higher end of the year after-tax profits on their books than does the LIFO method. Unfortunately, this is a "fool's profit." LIFO, on the other hand, shows lower profits on the books, and consequently, results in lower taxes.

The FIFO approach assumes that a printer first uses materials and supplies that were purchased a long ago when prices were lower. More recently purchased goods (bought at higher prices) are assumed to be used last, after the older, less costly materials are consumed. The newer materials and supplies are inventoried at a higher price. Since material and supply costs as well as the other costs of operating a business are deducted from sales costs, to determine pre-tax profits, these lower expenses will bounce profits to an unrealistic higher level.

The higher profit figures may seem appealing at first glance. They certainly will appeal to shareholders. But corporate taxes are based on the amount of a company's profits. What happens is that a printer using FIFO is reporting profits to the IRS that are too high, much the same way as if he had understated his selling and administrative expenses.

Valuing inventory with the LIFO method means that, in theory, a printer first places his most recently purchased materials and supplies into production. Again, during inflationary times, the most recent purchases represent higher dollar amounts than do earlier purchases. Although the rate of inflation has declined in recent years, costs of materials and supplies are still increasing, not shrinking.

These high-valued cost factors result in a more realistic, lower profit. In turn, a lower profit results in lower taxes, and the printer is left with more money available to help offset his rising costs.

As a practical matter, FIFO and LIFO only represent the hypothetical flow of goods through your plant. While reported profits will vary, depending on the use of FIFO or LIFO, in both methods exactly the same amount of cash flows in and out. The amount of tax levied is the only difference. FIFO users will pay higher taxes than their LIFO counterparts.

Furthermore, as costs climb, the difference between FIFO and LIFO users' tax payments increases correspondingly. The increased value of inventories remains untaxed for LIFO users. The FIFO taxpayer does not have this advantage.

The example shown on page 73 demonstrates exactly how significant the tax savings can be for a printing firm opting for LIFO over FIFO. In both cases, all reported income and expenses are exactly the same -- with the notable exception of materials and federal income taxes.

Using FIFO, the printing firm with $1,000,000 in sales values its inventory on a first-bought, first-used basis. This means that the company is reporting that the materials it places into production were purchased back when prices were lower than they are today. The $350,000 figure entered for materials will not buy the same volume of materials in the current market.

Converting to LIFO inventory, the same company saves $9,200, the equivalent of doing $92,000 more business that year at 10% profit before taxes. The printing firm reports that the materials required to produce its $1,000,000 in sales were valued at the current (most recently purchased) market price and not necessarily at the actual price paid for them. The LIFO method shows that $370,000 worth of materials were used, some $20,000 more than the same company reported using FIFO.

The additional $20,000 in materials cost decreases income before taxes by $20,000. The example shows that the LIFO system leads to lower reported income and lower taxes; in this instance, $9,200.

Assuming that the printer is going to replace all of his used materials, his actual costs will come much closer to the $370,000 figure shown in the LIFO approach than to the $350,000 in the FIFO entry.

Using FIFO, the company will have to take $20,000 from its after-tax profit and add it to its reported $350,000 materials cost to replace the used materials. This will reduce its after-tax profit from $85,050 to $65,050, or $9,200 less than the $74,250 after-tax profit produced by the LIFO method.

This $9,200 is not merely an "on paper" saving. It is hard cash in the bank, achieved by lower tax payments. If material costs (most recently purchased) had increased more than the $20,000 indicated in our example, it is not hard to see how an even greater tax saving would have occurred. Graphic Arts firms are foolish to continue reporting high profits realized under the FIFO method. They should convert immediately to the more favorable pre-tax profits enjoyed by LIFO users.

Because LIFO generally represents a change in inventory planning for graphic arts managers, questions about the method are expected. The following are typical questions and our answers:

Q. How does a printing firm switch from FIFO to LIFO?

A. All you have to do is file IRS Form 970 with the Internal Revenue Service explaining exactly what your inventory method entails. You don't have to receive permission; you just sit back and collect the tax benefits.

Q. Wouldn't you be less likely to receive a bank loan using LIFO instead of FIFO? After all, your profits are lower!

A. Bankers are not fools. They know the difference LIFO and FIFO makes in reported profits. They can easily adjust, either up or down, the reported profit figures from both methods. In fact, a serious banker might well question the business smarts of a printer who unnecessarily "gives" additional tax dollars to the IRS by using FIFO.

Q. How far back can you go when valuing inventory under LIFO? 2 years? 10 years? 50 years?

A. In the year that your conversion takes place, you use the previous year's ending inventory as your beginning or base. Any increases in inventory would come in beginning of the year purchases. Then, at the end of the next year you go back to that base, which is now two years old, as your starting point. If both you and your business last another 50 years, you would still go back to the inventory base established when you first converted the approach from FIFO to LIFO.

Q. Do we have to keep our inventory records at these LIFO values? What good are my paper and work-in-process inventories at prices that I paid in 1975?

A. If you keep your cost sheet at current hourly rates and your perpetual paper inventory at current prices, you can turn over your FIFO inventory to your accountant for conversion to LIFO.

Q. If we are going to sell our business, wouldn't we lose money by not using the FIFO method? Under LIFO our profit is lower and the inventory on the balance sheet is lower.

A. First of all, you should operate your business as efficiently as possible, not merely to report "fool's profits." But, if you did want to sell, you explain to your buyer how your inventory method works. Then, you sell your inventory at the current replacement cost and not at your LIFO value.

Q. Can I price all inventories by the LIFO method, including work-in-process, paper and other chargeable materials (ink, film and plates), and other non-chargeable supplies?

A. Yes. You are talking about big dollars and in a growing firm this amount keeps increasing. The LIFO inventory reserve gets bigger and the tax saving accumulation becomes more substantial.

LIFO VS. FIFO: COMPARISON OF PROFIT AND TAXES

	FIFO METHOD	LIFO METHOD
SALES	$1,000,000	$1,000,000
FACTORY COST OF PRODUCT		
MATERIAL*	350,000	370,000
FACTORY PAYROLL	260,000	260,000
FACTORY EXPENSES	106,000	106,000
	716,000	736,000
GROSS PROFIT	284,000	264,000
ADMINISTRATIVE AND SELLING EXPENSES	160,000	160,000
	124,000	104,000
INTEREST	10,000	10,000
	114,000	94,000
OTHER INCOME	6,000	6,000
INCOME BEFORE TAXES	120,000	100,000
FEDERAL INCOME TAXES	34,950	25,750
AFTER TAX PROFIT	$ 85,050	$ 74,250

*COST OF MATERIAL USED

INVENTORY - JANUARY 1	$ 150,000	$ 150,000
PURCHASES	360,000	360,000
	510,000	510,000
	(320,000 lbs. @ $.50)	(320,000 lbs. @ $.4375)
INVENTORY - DECEMBER 31	160,000	140,000
COST OF MATERIAL USED	$ 350,000	$ 370,000

Using the FIFO method, this printing firm valued its cost of paper at the most recent purchase price, $.50 per pound. Under LIFO, the same firm valued its paper at the earliest purchase price, $.4375 per pound. The FIFO system generates a "fool's profit" of $10,800 over the LIFO approach, while the LIFO system saves $9,200 in taxes.

STRATEGIES FOR BETTER COSTING AND PRICING

Economic conditions in recent years have forced business managers to seize tighter control of their costing and pricing strategies. Even though industrial trends showed that large printers have been relatively unaffected by recessionary pressures, the majority of medium to small printing firms were not as fortunate. These firms were ravaged by both inflationary and recessionary elements.

We are now told that the economy is, once again, mending nicely. Even if this is true, improvement is spotty with certain areas and printing markets experiencing great difficulties. In any case, the time is right for printing managers to employ updated costing and pricing strategies.

REPLACEMENT COSTS

The average printer is spending approximately 37% of sales on materials. Printers cannot use yesterday's costs to determine today's pricing. While this simple statement may sound obvious, the fact remains that the majority of printers do calculate prices based on outdated costs.

With costs continually changing, printers must be ready to update their costing and pricing systems. Furthermore, to price jobs profitably they must be able to anticipate what cost increases will be. That is the problem. Determining exact figures for these costing components is difficult.

The NIFO (Next-In, First-Out) method for materials costing ensures that a printing firm's costs for a job will be reported to allow for adequate funds to replace the goods used to produce the work.

Using the NIFO method, if you were to cost a job that required paper purchased at 46 cents per pound, film at $3.00 per sheet, and plates at $7.25, you would look ahead to what the replacement cost of these materials will be before you cost and price the work. If today's prices indicate that paper has jumped to 52 cents, film to $4.00, and plates to $8.60, these are the figures you would use to calculate both your costs and your final price.

Pricing and Costing Using Replacement Values

	Original Purchase Price	Current Price to Replace
Paper	$0.46/lb.	$0.52/lb.
Film	$3.00	$4.00
Plates	$7.25	$8.60

According to NIFO, you cost and price at:

Paper	Film	Plates
$0.52/lb	$4.00	$8.60

Keep in mind that the purpose of your cost and accounting system is to give you a clear picture of the ongoing financial operations of your business. The more accurate this picture is, the more intelligently you can price your printed product. Any system that does not provide for the replacement of materials and supplies will dig directly into your profit on that job.

UPDATED HOURLY COST RATES

Hourly cost rates are another factor with tremendous impact on costing and pricing. Production cost calculations must be re-examined at increasingly close intervals as the cost of doing business climbs.

Since the basis for accurate budgeted hourly rates is an analysis of current operating expenses and anticipating increased expenses, these rates must be reviewed continually to make sure they are profitable, competitive and are producing an acceptable income and return on investment.

INCREASED PRODUCTIVITY

Although the pace of increasing costs has slowed, printers must still find a way to maintain a competitive edge. They should take a close look at their levels of productivity. Improved productivity will lower the cost per unit and thus permit pricing to remain at competitive levels. Innovations are available in both management and technology that can give a big boost to productivity. Printers who do not keep pace with these innovations may well find that higher costs are driving them out of competition; sending their customers to a printer who can offer better prices.

If your cost per hour of production is, for example, $40.00 and you produce 5,000 units per hour, your costs are $8.00 for each 1,000 units. With advances in technology, it may be possible to lower the cost per unit and gain a competitive edge in the market. A $1 per thousand decrease in costs may make the difference between gaining or losing a big sale.

Units produced can be improved. It is a rare printer who can honestly say he cannot increase units produced per hour. For example, are your presses turning at full rated speed? A boost of 714 units produced per hour would lower the cost per unit to $7 per thousand. Even though this 14% increase might not be fully achieved, it is remarkable just how much productivity can be improved if you set your goal and keep to it.

Increased Productivity Keeps Cost Per Unit Down

	Cost Per Hour ($)	Units Produced (Per Hour)	Cost Per Unit ($ per M)
Base	$40.00	5,000	$8.00
714 Units Per Hour Increase	40.00	5,714	7.00

It may be necessary to buy new equipment to implement this increase in units produced per hour. Or, a production improvement program or merely an investment in higher quality materials may be sufficient. Often an increase in productivity can be effected without any added capital.

The profitable practices of today may be loss operations tomorrow. Printers must be ready to investigate all and any avenues that might lead to increased productivity. By doing so, they will be better prepared to maintain their customer base and possibly gain a larger share of the market. Tight controls must be maintained in all aspects of the business to help keep costs in line. Accounting systems must insure that all costs are reported, and that costs and prices are geared to ensure continuing a healthy operation. If these practices are followed enthusiastically, printing firms should be able to effectively compete and achieve higher levels of profitability.